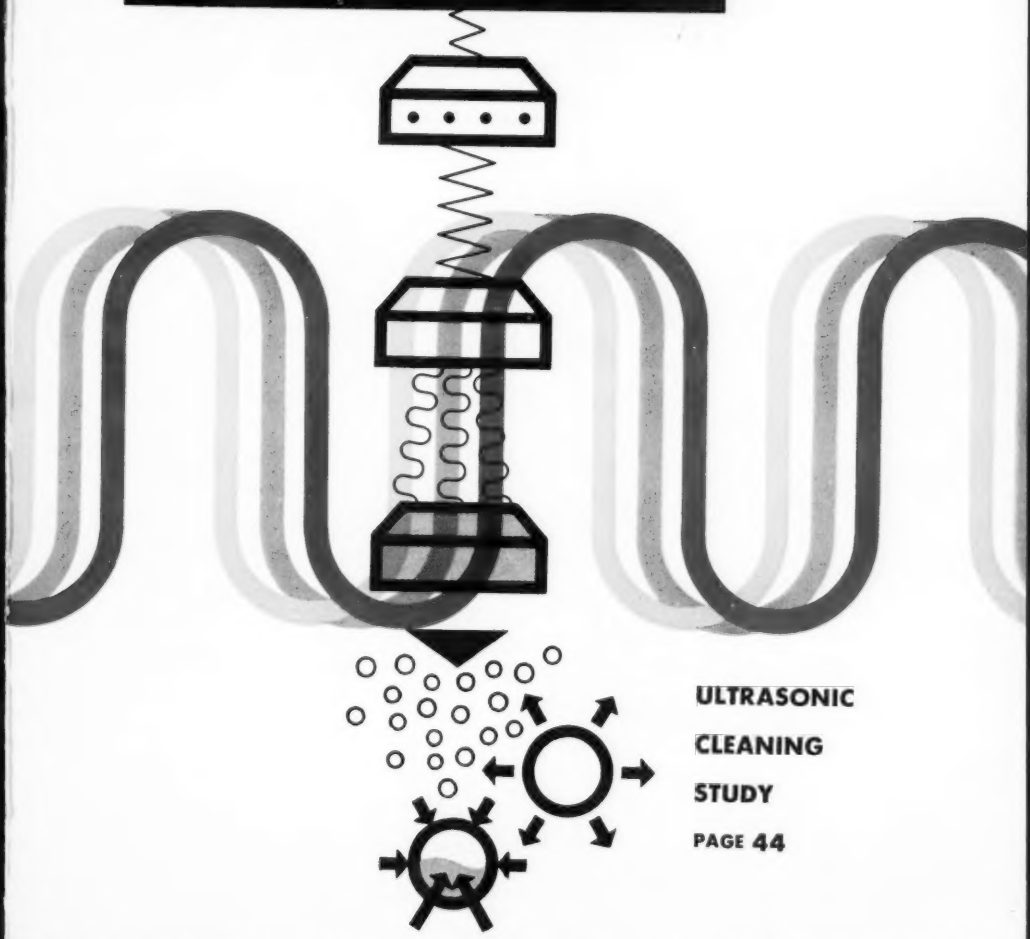
products finishing

DECEMBER

1961



ULTRASONIC CLEANING STUDY

PAGE 44

FINISHES ON METAL PRODUCTS

34¢ per part may be economical!

12/3¢ per part may be too much!

what does your metal cleaning cost?

You may be looking at cleaning department costs and saying: "that looks about right . . . it used to cost us a lot more!" Would you like to know, for sure, that your cleaning costs are just as low as they can be . . . with excellent results?

Many present day users of Cincinnati Cleaning machinery thought their former methods were modern . . . their costs low . . . their production high – until a Cincinnati cleaning unit proved savings of 60, 66, 75 and 81 percent in time and labor . . . along with production increases up to 200 percent!

The Cincinnati Cleaning service that led to these savings is available to you . . . without cost or obligation! Use the handy coupon for complete details.

For more data circle 301 on Postpaid Card

Cincinnati CLEANING & FINISHING MACHINERY CO
2008 HAGEMAN STREET, CINCINNATI 41, OHIO

☐ Have a Cincinnati engineer point out time and labor savings and production increases in our cleaning.

☐ Send literature on Cincinnati cleaning equipment.

company.....

address.....

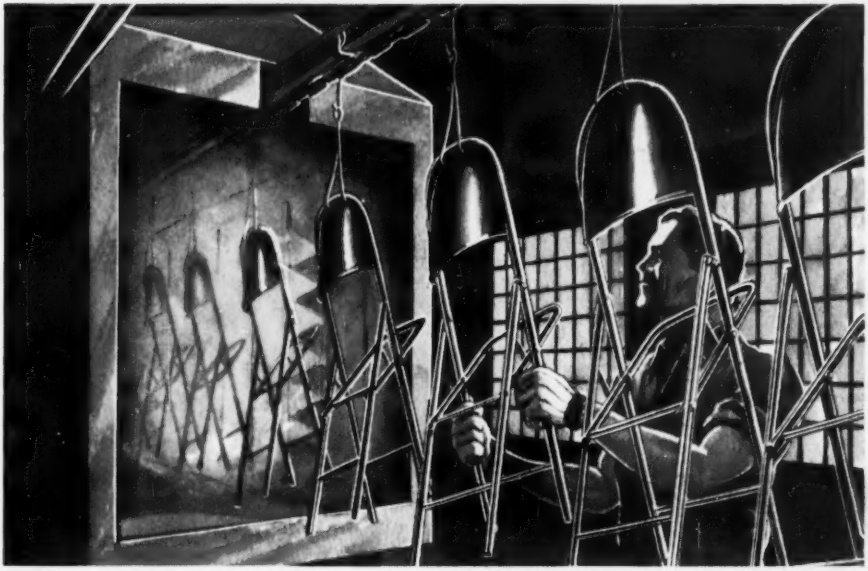
city.....state.....

name.....

For the best in pressure spray washing

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS



Even the highest spray washer pressures won't foam Oakite 161 alkaline detergent

Turn on the highest pressures to speed cleaning—you won't get any foaming problems with Oakite 161. Nor any etching problems, either. This alkaline detergent is specially designed for *safe* pressure spray washing of any metal —aluminum, white metals, brass, steel.

And it does a thorough job. Oakite 161 blasts off identification inks, grease, oil and shop soils... gives a completely clean surface for inspection or final finishing. Costly? Not at all. Extra long solution life and low concentrations assure low per-unit production costs.

One of a complete line of Oakite products for spray washers, Oakite 161 is complemented by heavy-duty solvent cleaners, moderate to light-duty alkaline materials. Ask the Oakite man to help you make the choice that's right for your washer...right for your products. Or send for Bulletin F-9773. Oakite Products, Inc., 32F Rector Street, New York 6, N. Y.

it PAYS to ask Oakite

OAKITE

over 50 Est. 1909 SCIENCE

years' leadership in industrial cleaning

For more data circle 304 on Postpaid Card

Barrel finishing is best finishing

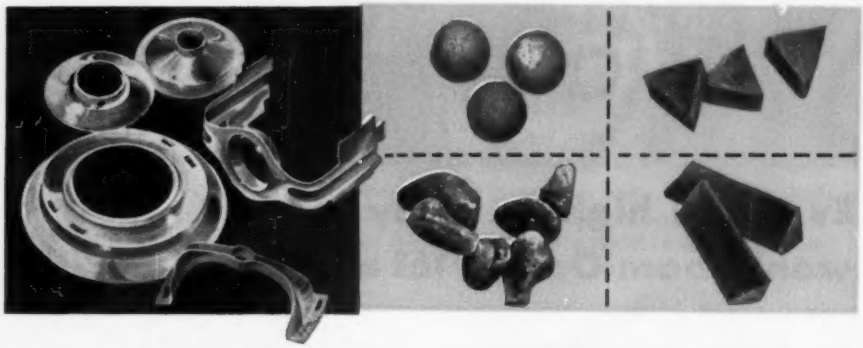
... to cut your assembling costs

Assembling finished parts is no longer the money-wasting problem it used to be.

Barrel finishing with Norton TUMBLEX abrasives is your modern solution ... your surest, quickest way to remove burrs, heat scale, sharp or rough edges and other surface imperfections that keep complicated parts from fitting together smoothly and accurately.

We say *your* solution because the scope of TUMBLEX abrasives is virtually unlimited. The parts you finish . . . for assembling or for any other purpose . . . can be of any metal, ferrous or non-ferrous . . . or non-metallic including plastics and even woods . . . as hard as sintered oxides or soft as the softest machinable material . . . and their sizes can range from miniature to massive.

Barrel finishing with the right TUMBLEX abrasive not only improves your product appearance and quality — its speed and simplicity can increase your man-hour productivity and cut your cost-per-piece produced.



Without extensive hand-finishing and fitting, the assembly of these stamped component parts of an automotive thermostat was long and difficult. Barrel finishing with Norton TUMBLEX* abrasive proved unequalled for removing burrs that brought new speed to assembling.

Get complete proof. Send sample parts to our Sample Processing Department. We'll barrel finish, return samples and report the methods and abrasives you need for new production advantages. NORTON COMPANY, General Offices, Worcester 6, Massachusetts. Plants and distributors around the world.

*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries

NORTON ABRASIVES

G-408

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals
BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

For more data circle 305 on Postpaid Card

Shows How to "ROHCO-Optimize" Your Plating for Bigger Profits!

Send for it now. No cost or obligation. Gives you complete details of technical methods and procedures so successfully practiced by hundreds of leading platers already ROHCO-Optimized for bigger profits. Helps you streamline your operations for greater output-per-hour and finer quality, at lower cost in materials, manhours and overhead. "ROHCO-Optimize" your plant for tomorrow's super-plating TODAY! Just write "Free Manual" on your letterhead — and mail to us, or ask your ROHCO Distributor.

Nationwide Stockpoints

R. O. HULL & COMPANY, Inc.
1330 Parsons Court • Rocky River 16, Ohio

CADMIUM PLATING PRODUCTS

ROHCO 20 XL and Super XL: World's leading cadmium brighteners.

ROHCO Cad-Sol: Add water for instant cadmium plating bath.

ZINC PLATING PRODUCTS

ROHCO 100 and ROHCO 102: Barrel zinc brighteners for brilliant, blue-white deposits.

Econobrite: Economical, bright deposits, suitable for post-plating dip.

Perma-Brites: Uniform, commercial finishes at lowest cost.

ROHCO 503: Most popular zinc brightener in plating.

ROHCO Zinc Purifier: Purges zinc plating baths — saves brightener.

ROHCO Zinc Sol: Add water for instant zinc plating bath.

ROHCO ZW-600: Wetting agent for more efficient, cleaner zinc plating.

CONVERSION COATINGS

Rodips CD-3, CD-4, CZ-10, and Rebleck for cadmium: Superior post-plating treatments for passivating and coloring cadmium plate.

Rodips ZN-22, ZN-23, ZN-25, ZN-30, etc., for zinc: Superior post-plating treatments for passivating and coloring zinc plate.

Rodip AL-50 for aluminum: Superior chromate treatment imparts corrosion protection to aluminum and its alloys.

OTHER ROHCO PRODUCTS

ROHCO Super No-Cro-Mist and ROHCO Anti-Spray: Spray suppressants for chromium plating baths.

ROHCO Rins-Aid: Water sheddet; improves drying, prevents staining.

Rodip AL-44: Improves aluminum brite dips.

Hull Cells, Rectifiers and Related Plating Test Equipment: Wide range of models for every purpose and convenience.

"The right start . . . a better finish"
For more data circle 306 on Postpaid Card

"By plating this part with LEVELUME 220 we slashed polishing time in half"

says JOSEPH T. HINES, Plant Manager, Southern Finishers, Inc., Nashville, Tenn.

A 50% reduction in the time it takes to polish this griddle cover is only *one* of the reasons Southern Finishers, Inc., is so enthusiastic about Levelume 220. This plater of some 500 different parts has cut polishing time one-quarter in *over-all* operations. Copper plating and buffing have been done away with on the griddle part and many others—saving up to two steps in seven.

"Appearance is better, too," says Joe Hines, a plater for 16 years. "Levelume 220 hides scratches nicely, plates brighter in recessed areas than any bath I've ever seen."

Southern is plating parts from ½-inch faucet buttons to 64" x 25" wire racks. What will Levelume 220 do on what *you're* plating? Ask H-VW-M.

H-VW-M *Progress in metalfinishing through advanced processes • equipment*

Hanson-Van Winkle-Munning Company, Matawan, New Jersey • Offices in Principal Cities
Alert Supply Company is H-VW-M in the West • Los Angeles • San Francisco
For more data circle 307 on Postpaid Card

M. L. FORNEY, *Publisher*
RICHARD S. KLINE, *General Manager*
EZRA A. BLOUNT, *Editor*
GERARD H. POLL, JR., *Associate Editor*
DR. NELSON F. MURPHY, *Contributing Editor*
NORMAN S. ROGERS, *Art Editor*
JEROME G. APKE, *Circulation Manager*

products finishing

Vol. 26 No. 3 December, 1961

FEATURES IN THIS ISSUE:

35 *Cooperation and Common Sense in Waste Disposal* • Editorial

36 *Prepaint Process Removes Light Corrosion*
• By Ezra A. Blount, Editor

44 *Ultrasonic Cleaning: Theory and Application*
• By Richard W. Thomas

66 *Platers' Pickling Problems*
• Reported by Gerard H. Poll, Jr., Associate Editor

74 *Painting 10,000 Small Gasoline Engines Daily*

82 *Barrel Plating Problems*
• Reported by Gerard H. Poll, Jr., Associate Editor

6 Advertising Representatives

DEPARTMENTS:

32 This Month in PF
93 Coming Up
94 New Products
134 Free Literature
149 Classified Advertising: Positions Available; Used Machinery; Professional Cards; Services
150 Industry News
165 Meetings of Interest to Finishers
166 1961 Article Index
174 The Finishing Touch
176 December Advertisers' Index

Member
BPA
Metal Finishing Suppliers' Association, Inc.
NBP

contents

Published monthly with two issues in March and copyrighted 1961 by Gardner Publications, Inc., 431 Main St., Cincinnati, Ohio. Printed in U.S.A.

STUTZ

BALL ANODE CONTAINER NEW CONSTRUCTION FOR LONGER SERVICE

STUTZ CONSTRUCTION — Heavy gauge steel with wire woven through steel angle firmly attached to main stem. Cannot come apart or loosen. Side clip is for STUTZ BARREL PLATING TANKS having submerged rectangular anode bars. Side clip not furnished for racked plating tanks, unless specified. Standard hook 6 inches. Other hook lengths available, however, deliveries could be delayed.

WELDED CONSTRUCTION — Note how welds have dissolved or broken in use. Often caused in barrel plating where currents are high and barrel transfer is rapid.

PRICES—12 cents per inch for basket lengths 18 inches or longer in increments of 3 inches. Side clips 25c extra. Shorter containers available at 18" price. Curved containers one size only, 27" for 14" and 16" diameter barrels 15c per basket additional.

Serving Industry 35 Years

THE STUTZ CO.

4410 Carroll Ave., Chicago 24, Ill.

For more data circle 308 on Postpaid Card

products finishing

advertising representatives

Duncan W. Barton, 60 East 42nd St., New York 17, N. Y., Murray Hill 7-7390. Eastern Pennsylvania, central New York State, New Jersey, Maryland, Delaware, Washington, D. C., Long Island, Brooklyn, New York City, Staten Island.

Granville M. Fillmore, *Vice President,* 60 East 42nd St., New York 17, N. Y., Murray Hill 7-7390. Eastern New York State, Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine.

George E. Hay, 431 Main Street, Cincinnati 2, Ohio, CHerry 1-5924. Western Pennsylvania, western New York, Ohio, Kentucky.

John M. Krings, *Vice President,* Room 211-A, 540 N. Michigan Ave., Chicago 11, Ill., DElaware 7-5441. Western Michigan, Illinois, Wisconsin, Iowa, Minnesota, the Dakotas, northern Indiana.

Jeryl L. Marlatt, 1051 Brooklawn Rd., Birmingham, Michigan, MIdwest 6-5935. Eastern Michigan, northwestern Ohio.

Norman S. Rogers, 431 Main Street, Cincinnati 2, Ohio, CHerry 1-5924. Central and southern Indiana.

Gene J. Schwarber, *Advertising Manager,* 431 Main Street, Cincinnati 2, Ohio, CHerry 1-5924. Missouri, Kansas.

Charles F. Meister, Charles F. Meister Co., 2252 W. Beverly Blvd., Los Angeles 57, Calif. DUnkirk 8-7115. California, Washington, Oregon.

★ ★ ★

Circulation over 24,500— largest in the finishing field

America's most complete line of

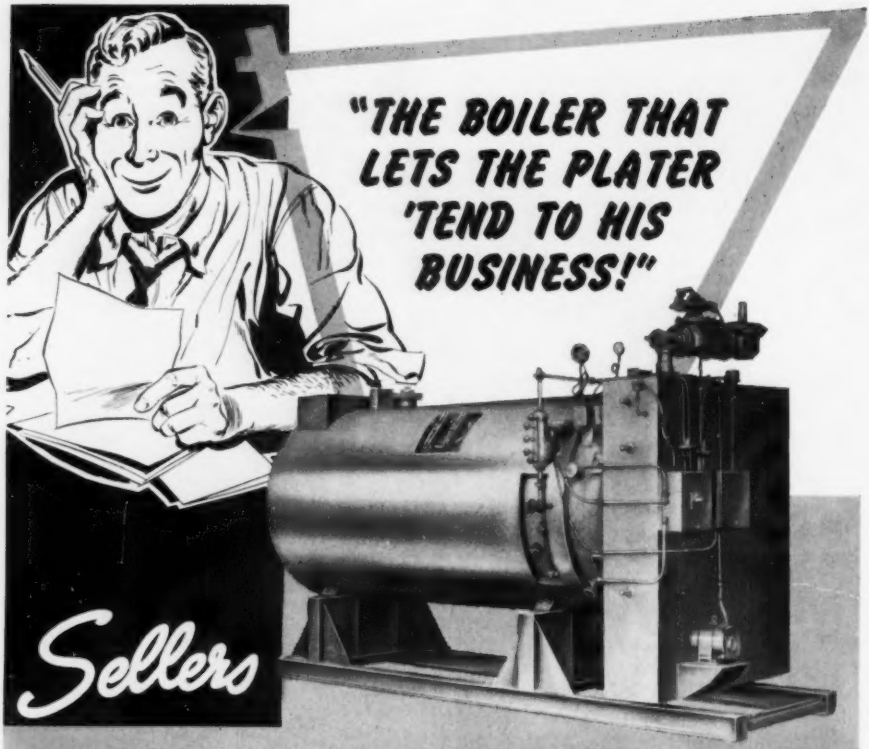
POLISHING, BUFFING and DEBURRING MACHINERY

We offer a complete line of Turrets, both indexing and continuous, from 21" to 10' in diameter, and Strait Line conveyors in all styles and almost any length. The right finishing head for the job is available from 1 to 30 HP in floating or rigid types. Junior Automatics, "OD" Cylindrical Finishing Machines, and specials are available for high production finishing of household appliances, brass goods, automotive parts, plumbing supplies, etc. Ask for factory trained engineer to discuss your finishing problems — no obligation.

Hammond Machinery Builders INC.

1622 DOUGLAS AVENUE KALAMAZOO, MICHIGAN

For more data circle 309 on Postpaid Card



THE TROUBLE-FREE IMMERSION BOILER

- No open flame
- Simple design
- Positive pressure blower overcomes building vacuum and chimney back draft
- Easy accessibility
- Self-cleaning tubes
- No foul fumes
- Safe, complete combustion
- Low cost maintenance
- No scale problem
- Maximum heat transfer

Write for Bulletin 5209-A

Sellers ENGINEERING COMPANY

4876 North Clark Street • Chicago 40, Illinois

For more data circle 310 on Postpaid Card

How "Plus-4®" Anodes cut electroplating costs

Tank sludge, build-up of copper sulfate in solution, and cathode roughness due to the sludging off of tiny copper particles from the anode are costly problems in acid-copper electroplating. "Plus-4" (phosphorized copper) wrought anodes solve these problems effectively.

Take anode sludge, for example. "Plus-4" anodes *eliminate* sludge formation. The phosphorized copper in "Plus-4's" develops an adherent dark brown film during electrolysis. This in no way interferes with plating, nor does it increase the electrical resistance of the bath.

For further details, write for your copy of Publication C-5 which describes Anaconda Wrought Anodes in greater detail. Address: Anaconda American Brass Co., Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

61-929

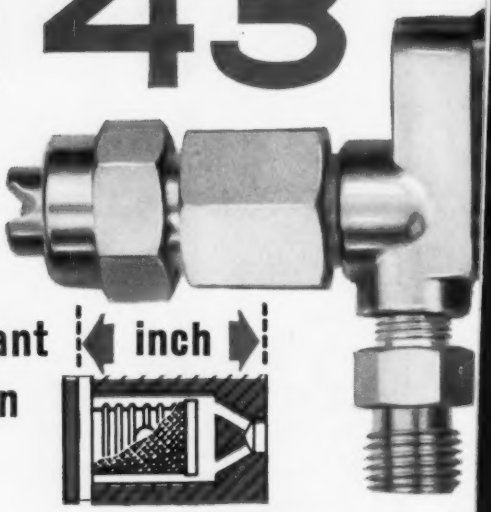
New low price anode—Electranodes® are pure Anaconda copper anodes a full 1 inch thick. If you need an "economy-type" anode, Electranodes are the best for the least.

ANACONDA®
AMERICAN BRASS COMPANY

For more data circle 311 on Postpaid Card

Another NEW from Binks

model 43



FEATURING

... the most important inch of an airless spray gun

NEW removable metal screen cartridge keeps nozzles clear longer by trapping foreign particles before they reach and clog the nozzle.

NEW diffuser nut makes nozzle tip changing completely safe. The nut diverts the fluid on an angle to the side walls of a chamber taming velocity and impact of the fluid stream to a harmless level.

NEW positive trigger lock reduces operator fatigue by locking the trigger in place for continuous spraying; a squeeze on the trigger unlocks it.

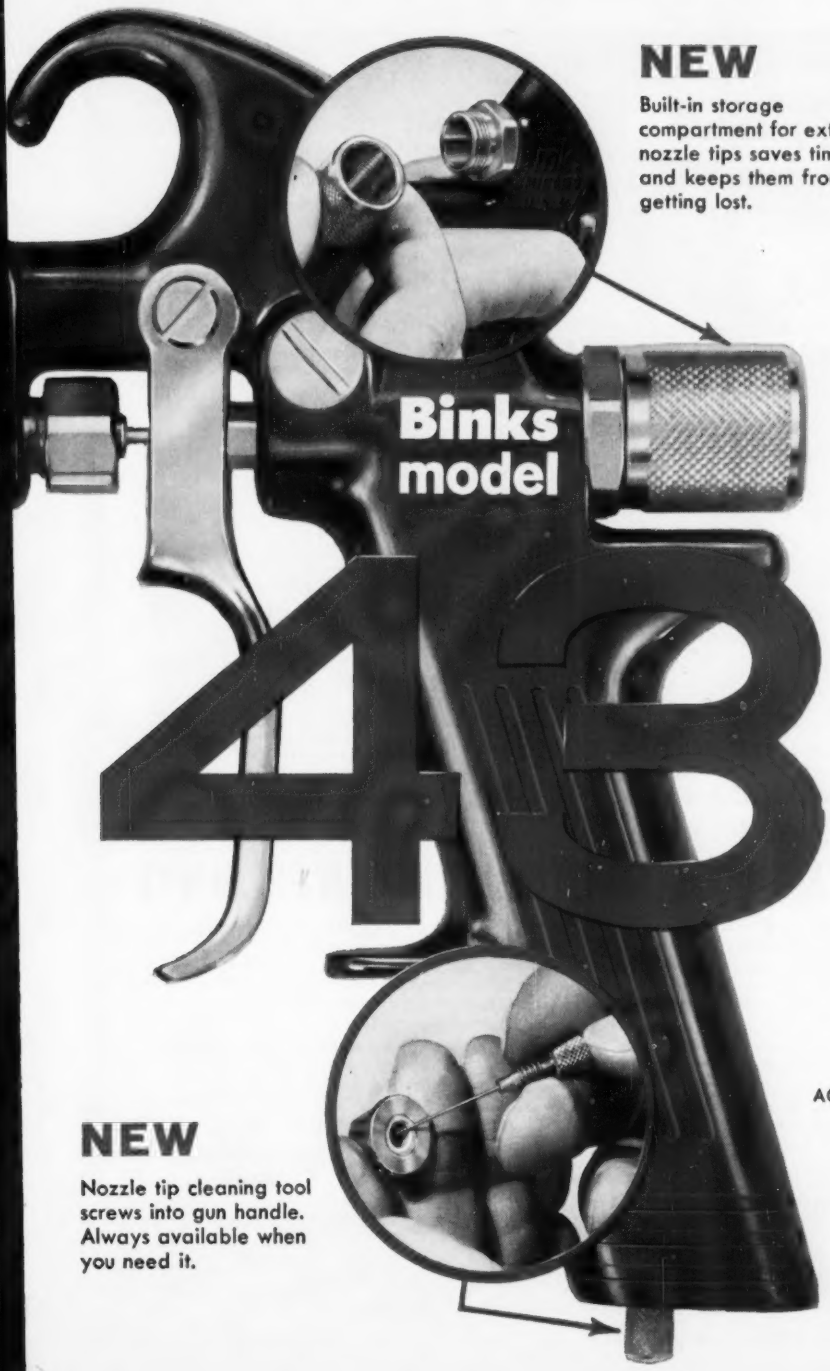
PLUS all standard quality features users expect with Binks spray painting equipment. Put the Model 43 to work in your operation . . . it can be used with any airless spray painting unit.

CALL OR WRITE TODAY for all the facts. Ask for Bulletin A52-7. Your Binks Representative is as close as your telephone. Ask about the free spray painting school, too. Open to all. No tuition. Binks Manufacturing Company, 3122 Carroll Avenue, Chicago 12, Ill.

1479 REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES · SEE YOUR CLASSIFIED DIRECTORY

Binks Everything for spray painting

For more data circle 312 on Postpaid Card



NEW

Built-in storage compartment for extra nozzle tips saves time and keeps them from getting lost.

ACTUAL SIZE

NEW

Nozzle tip cleaning tool screws into gun handle. Always available when you need it.

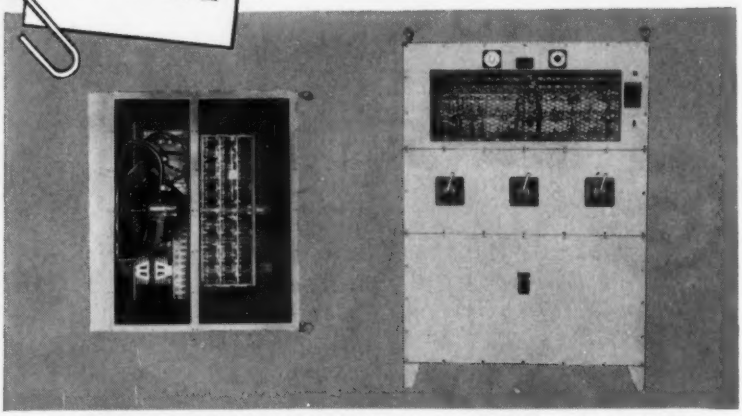
SYNTRON

CASE HISTORY

another successful application in the

No. 3471

ELECTROPLATING INDUSTRY



INDUSTRIAL PLATING COMPANY • CLEVELAND, OHIO

Reduces Power Costs 36%

by installing a

SYNTRON RECTIFIER POWER UNIT

Slightly less than a year ago, Industrial Plating Company of Cleveland, Ohio replaced a motor generator and selenium rectifier power unit with a Syntron 6000 amp, 5-15 volt Silicon Rectifier Power Unit. A spokesman for the Company declares that since this unit was installed, power bills have not exceeded $700.00 a month against an average of $1100.00 per month with the old units. This is a 36% reduction in power cost.

Syntron Rectifier Power Units provide instantaneous operation efficiency, long life, high power factor from 92 to 97.5%, low operating and maintenance cost.

Syntron Rectifier Power Units are designed for industrial applications. Each according to Specific power needs. This savings in power costs realized by Industrial Plating Company can apply to your operation.

Write for complete information.

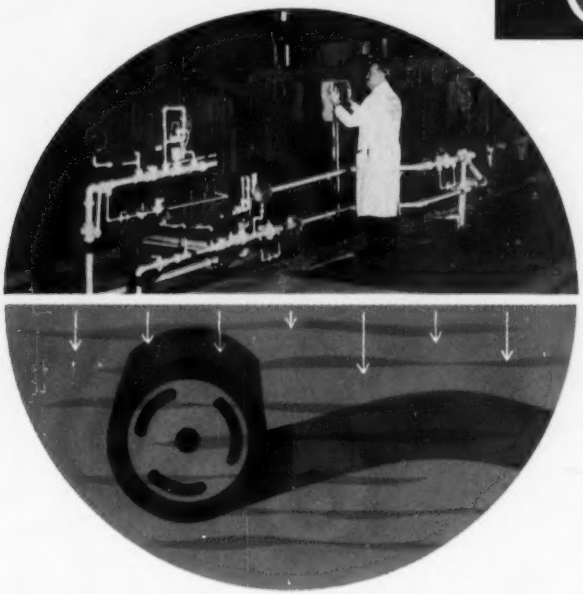
SYNTRON

SYNTRON COMPANY

452 Lexington Avenue • Homer City, Pa.

For more data circle 313 on Postpaid Card

Pennsalt System Approach for better cleaning



Stainless strip cleaned to "white glove" perfection

A major reason why stainless steel strip made by Superior Steel Division of Copperweld Steel looks uniformly stain-free *after* annealing is the thorough job of cleaning *before* annealing . . . by a team of Pennsalt chemicals and equipment.

The equipment. An automatic, multi-stage Pennsalt washer provides a cycle of alkali brush wash, brush rinse, steam flood and drying—"white glove" cleaning that completely removes mill soils which might burn on in the furnace with resultant discoloration. Strip up to 24 inches wide, in gauges from .010 to .050, is handled at speeds up to 90 feet per minute.

The chemicals. One of the standard Pennsalt cleaners, a concentrated, granular alkaline material designed specifically for spray or soak cleaning of steel or brass, was recommended by Pennsalt field men for the specific soils encountered at Superior Steel.

Pennsalt System Approach. Because we make both chemicals and equipment, we can team them for top quality and lowest costs . . . in cleaning, phosphating, drawing lubrication and pickling.

Nationwide service. Pennsalt specialists analyze your needs, aid start-up, then live with your line. Write or call today.

. . . a better start for your finish®

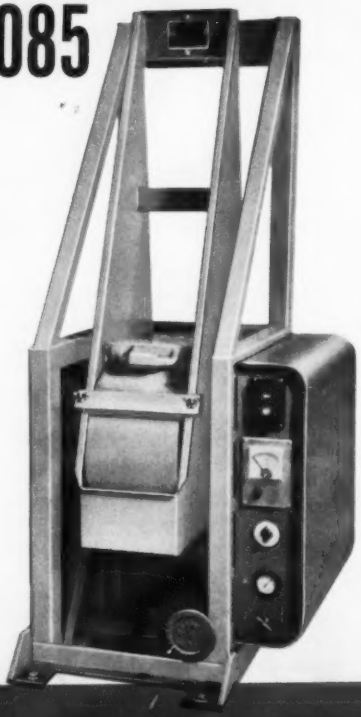
Metal Processing Department
PENNSALT CHEMICALS CORPORATION
East: 3 Penn Center, Philadelphia 2, Pa.
West: 2700 S. Eastern Ave., Los Angeles 22, Calif.
Pennsalt Chemicals of Canada Ltd., Oakville, Ontario • Industrial Química Pennsalt, Mexico City
For more data circle 314 on Postpaid Card

Pennsalt Chemicals ESTABLISHED 1850

NOW! Own A Rampe Model 10 VI-BRADER®

controlled orbital finishing® machine for just...

$1085



The new Rampe Model 10 Vi-Brader is an orbital finishing machine that sets new standards for high-speed output. Its exceptionally low cost and amazing cutting speed make it an ideal machine for almost every finishing installation.

Secret of the Vi-Brader is its circular pattern of load movement, created by exclusive Rampe Controlled Orbital Finishing. Actual tests show this process cuts many finishing jobs from hours to minutes, performs work impossible with conventional machines. And uniform results are unsurpassed.

RECIRCULATING Models (available at additional cost) provide vast improvement in savings of media and compounds, with cleaner and better production. Water tank base permits simple, compact installation in minimum space.

Extra features include variable orbital rate 900 to 1800 rpm, tubs or barrels up to 1.25 cu. ft., and wide selection of accessory controls.

Also available are Rampe Precision Barrel Finishing Machines in over 71 models, up to 40 cu. ft. capacity. See your dealer — or send for complete catalog today.

For more data circle 315 on Postpaid Card

RAMPE

RAMPE MANUFACTURING CO. Cleveland 10, Ohio

Industry's Most Complete Line of Barrel Finishing Equipment

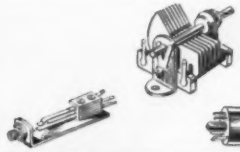
® Rampe Mfg. Co. Trademark

a simplified mirror-bright silver plating process for electrical and electronic components

Here is the most efficient, simple procedure to protect electrical electronic and lamp components with a mirror-bright silver finish—through a complete range from flash to heavy deposit. The procedure is easy, economical and non-critical —with little or no polishing required. Silva-Brite is a clear, water-white solution, enabling the operator to observe work as it is being plated. Uniformly good results are attained with current densities ranging from 10 to 40 amperes per square foot. Normal room temperature operation minimizes fumes and tendency toward bath decomposition. Send for descriptive data together with detailed plating procedures.

AMERICAN PLATINUM & SILVER DIVISION
231 N. J. RAILROAD AVENUE, NEWARK, N. J.

corrosion-resistant rhodium plating



The properties of Rhodium are particularly well-suited to many electrical and electronic applications. In general, Rhodium improves efficiency whenever a low-resistance, long-wearing, oxide-free contact is required. Rhodium plate assures low noise level for moving contacts, no oxide rectification, low and stable contact resistance. Rhodium plated slip rings and commutators show negligible wear. The positive action of plated contacts subjected to long periods of inactivity emphasizes the efficiency of Rhodium for safety alarm contacts. Excellent protection against atmospheric corrosion is obtained for printed circuits by plating Rhodium over nickel to assure long wear and low noise, or Rhodium over Silver to protect against tarnish and corrosion.

In the realm of high and ultra-high frequency the high resistance of Rhodium to surface corrosion under all atmospheric conditions is specially useful. Oxide-free contacts eliminate partial rectification and unwanted signals.

Call for technical assistance or write for literature.

CHEMICAL DIVISION • 113 ASTOR STREET
NEWARK, N. J.

CRYSTAL STRUCTURE	FACE CENTERED CUBIC A° 3.7954
ATOMIC WEIGHT	102.91
DENSITY	12.44
MELTING POINT	1966°C
COEF. OF LIN. EXPANSION	8.19 X 10 ° 0°C, PER °C
THERMAL CONDUCTIVITY	(0°C) 213 C.G.S. UNITS
REFLECTIVITY ELECTROPLATE	78% AT—620 MU
HARDNESS ELECTROPLATE	540-640 V.H.N. 20 GRAM LOAD

ENGELHARD
INDUSTRIES, INC.
EXECUTIVE OFFICES:
113 ASTOR STREET · NEWARK 2, NEW JERSEY

SALES OFFICES: CHICAGO • DALLAS • DETROIT • HOUSTON • LOS ANGELES • NEW YORK • ORLANDO • PROVIDENCE • SAN FRANCISCO • WASHINGTON, D. C.

Please send literature as indicated below, addressed to my attention:

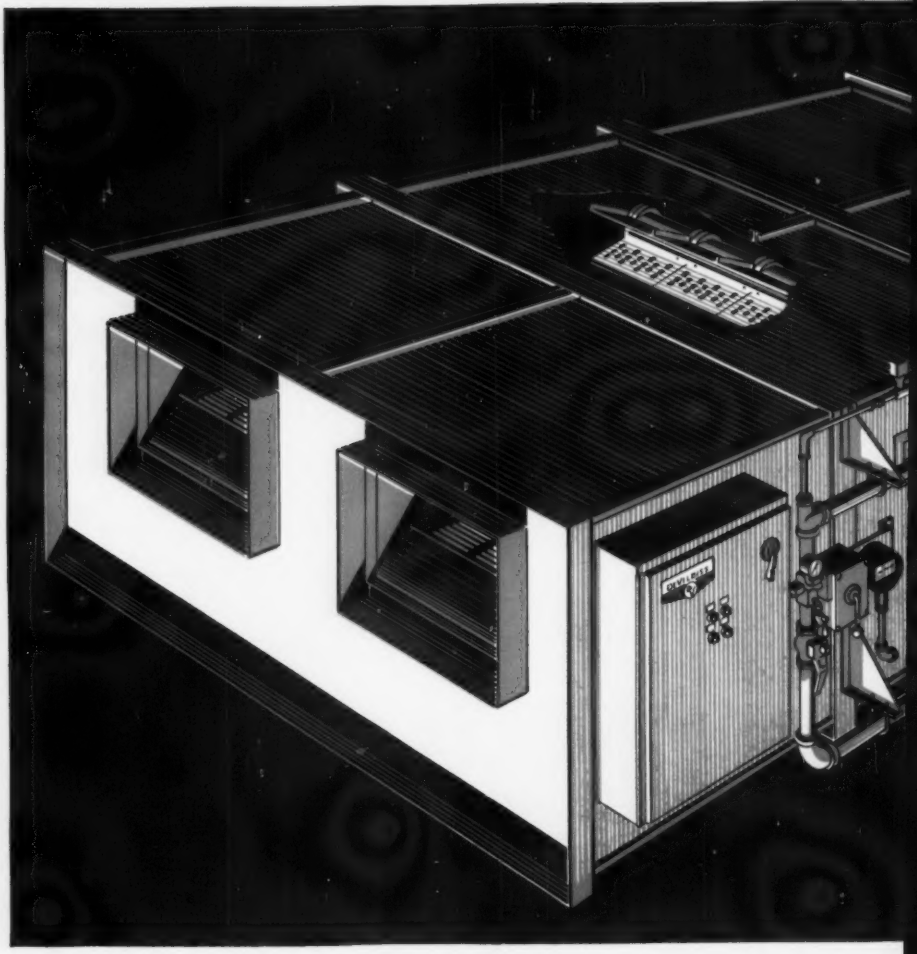
☐ SilvaBrite Silver Plating ☐ Rhodium Plating

NAME .....
TITLE .....
FIRM .....
STREET .....
CITY ..... ZONE ..... STATE .....

For more data circle 316 on Postpaid Card

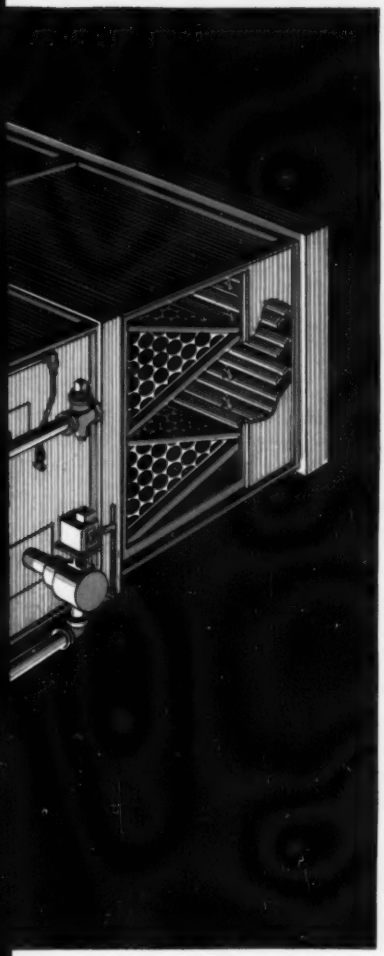
Effective air

with DeVilbiss air-replacement



balance

units



Your plant runs more smoothly when you have correct air balance. This means replacing the tempered air you're exhausting from spray booths, bake ovens, plating rooms, welding areas, dust-collection systems, parts washers and similar equipment. You have better ventilation, fewer drafts and cold spots, less heat load on your central heating system. Your exhaust system functions properly; employees are more comfortable. For volumes up to 40,000 CFM, DeVilbiss packaged air-replacement units are your answer. They come complete with housings, fans, burners, controls, filters, dampers, roof or wall air intakes—ready to install. For larger needs, we can design a make-up air system as simple or elaborate as required—manual or automatic—to meet your climate and plant conditions. Call us. Our engineering, fabrication, and installation experience encompasses systems of all types. The DeVilbiss Company, Toledo 1, Ohio. Also Barrie, Ontario; London, England; São Paulo, Brazil. Offices in principal cities.

FOR TOTAL SERVICE, CALL

DEVILBISS

For more data circle 317 on Postpaid Card

ULTRASONIC EQUIPMENT BY WESTINGHOUSE

MORE CLEANING POWER PER WATT . . . HIGHEST PRODUCTION LINE RELIABILITY

Production line cleaning jobs are easier, faster with high power Westinghouse ultrasonic cleaning equipment. Solid-state ultrasonic generators achieve greater reliability, higher efficiency, and take less space. The new Westinghouse Magnapak transducers deliver more usable power than other transducers for the same electrical input. Tank sizes: 1½ to 600 gallons, power ranges from 250 to 25,000 watts. *Equipment is backed by local service—nationwide.*

Ask the Westinghouse Industrial Electronics Department, 2519 Wilkens Avenue, Baltimore 3, Maryland, for specific information, or a demonstration of how modern ultrasonics can solve *your* cleaning problem. *You can be sure . . . if it's*

Westinghouse

J-21031

For more data circle 318 on Postpaid Card

The Interlox line was developed to give you a better, lower cost, easily controlled phosphate coating. Its exceptional cleaning ability combined with a radically different type of accelerator produces an even, fine grained, dense coating which locks your organic finish to the metal.

Interlox eliminates streaks, stains, powdery deposits, and flash rusting, giving you the ultimate in appearance, adhesion and resistance to humidity and salt-spray.

Additional cleaning power is easily obtained, when desired, by the addition of a low-cost detergent only, thus avoiding the danger of over-phosphatizing and the costly practice of adding complete phosphatizing compound when only cleaner is required.

There is an Interlox product developed to meet your particular need whether spray or immersion type, single or multiple stage. Interlox baths are unusually long lived and require less additions and control.

Licensed Manufacturers { Alert Supply Co., Los Angeles, California
Armalite Company, Ltd., Toronto, Canada

NORTHWEST CHEMICAL COMPANY
9310 ROSELAWN • DETROIT 4, MICHIGAN
CHEMICAL PRODUCTS DIVISION • CHEMETRON CORPORATION

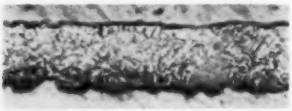
For more data circle 319 on Postpaid Card

Call Du Pont: for better top-quality chemicals . . . timesaving

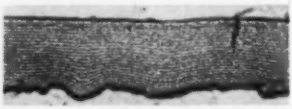
Now . . . you can deposit a level coat of copper on metal parts

New process lowers finishing costs . . . improves appearance . . . provides an excellent undercoating for nickel and chromium.

1. Photomicrograph shows 0.001-inch copper plating on polished steel of 24 RMS. Conventional copper plating (above) shows uneven surface using direct current.



2. Du Pont's level-coating process with *interrupted current* shows amorphous structure and relatively level surface . . . satisfactory where maximum leveling is not required.

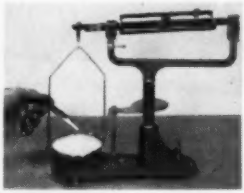


3. Same process with current reversal gives laminar structure, extremely level surface. *Current reversal* is employed where maximum leveling of surface is desired

A combination of chemical additives and current variations form the basis of this new leveled copper plating method. Included are a high-efficiency cyanide copper bath and special Du Pont addition agents: Elchem 1396 and 1442M. The process can be easily and inexpensively adapted to most plating operations.

You'll avoid trouble and save time with new Du Pont double salts—

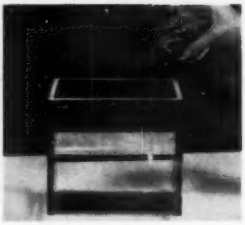
Sodium-Copper Cyanide and Potassium-Copper Cyanide



NEW DIRECT METHOD

1. You weigh required amount of Du Pont double salt instead of potassium or sodium cyanide *and* copper cyanide.

2. You dissolve double salt in water or plating solution. You eliminate steps of dissolving separate chemicals.



3. You add double salt directly to plating tank with no filtering necessary. Active ingredients are in proportions usually required. You save time, reduce handling, avoid waste and mixing errors.

The balanced composition of Du Pont double salts simplifies calculations required in making up new baths or replenishments. (1 oz. potassium-copper cyanide double salt equals 0.26 oz. copper, or 0.37 oz. copper cyanide; 1 oz. sodium-copper cyanide double salt equals 0.29 oz. copper or 0.41 oz. copper cyanide.) Both Du Pont double salts are packed in handy, moisture-resistant 100-lb. net fiber containers.

DISTRICT OFFICES

Atlanta 9, Ga. . . . . 1261 Spring St. N.W.
Baltimore 2, Md. . . . . 321 Fallsway
Boston, Mass. 45 Fourth Ave., Waltham 54, Mass.
Charlotte 1, N. C. . . . . 427 W. Fourth St.
Chicago 46, Ill. 7250 N. Cicero Ave., Lincolnwood
Cincinnati 2, Ohio . . . . 2412 Carew Tower
Cleveland 20, Ohio . . . . 11900 Shaker Blvd.
Dallas 21, Texas . . . . 8510 Ambassador Row
Detroit 35, Mich. . . . . 13000 W. Seven Mile Rd.
Los Angeles, Calif. P.O. Box 70, El Monte, Calif.
New York 1, N. Y. . . . . 350 Fifth Ave.
Phila., Pa. 308 E. Lancaster Ave., Wynnewood, Pa.
San Francisco 24, Calif. . . . 1485 Bayshore Blvd.
Export Division . . Du Pont Building . . Wilmington 98, Delaware
Du Pont de Nemours International S. A. . . Geneva, Switzerland

electroplating at your plant... methods... dependable service

Two convenient forms of sodium cyanide 97%

ALL-PURPOSE CYANOBRIK®

—handy, pillow-shaped briquettes of 97% minimum sodium cyanide for all applications: plating, case hardening and chemical manufacture. Cuts inventory and purchasing problems. Made by a new Du Pont process, the briquettes are lower in moisture content and are more moisture-resistant than before.

CYANOGRAN® M

—granular, easily dissolved form of 97% minimum sodium cyanide. Ideal for dry compounding where uniformity of size is desired. "Cyanogran" M will pass through a 10 mesh screen; is retained on a 50 mesh screen. Absence of fines and dusting makes it easy to handle. It sells at the same low price as All-Purpose "Cyanobrik".

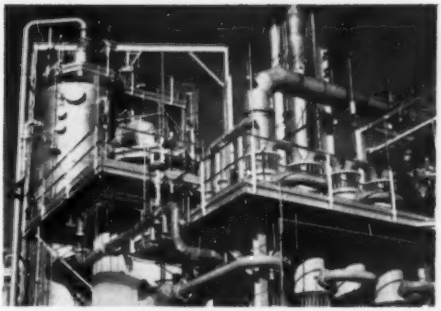
Du Pont sodium cyanides are highly suitable for cyanide electroplating solutions, including copper, brass, zinc and cadmium normally using sodium cyanide. Negligible sulfide content makes them especially attractive for use in sulfide-sensitive, bright copper baths. Specifications:

(NaCN-97% min.; NaCl-0.2% max.; Sulfides as S-0.0005% max.)

POTASSIUM CYANIDE

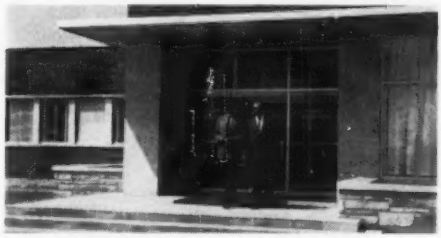
The extremely low sulfide content and high assay of Du Pont potassium cyanide make it ideal for all plating solutions in which potassium cyanide is specified. It is particularly suitable for use in modern bright cyanide copper, gold and silver plating baths. Specifications:

(KCN-98% min.; KCl-0.5% max.; Sulfides as S-0.0003% max.)



New modern plant assures reliable domestic source of supply

Centrally located in Memphis, Tenn., Du Pont's new chemical plant (above) is producing the high-quality sodium and potassium cyanides mentioned at left. This new source of supply means that you can depend on Du Pont to meet your needs quickly . . . at all times.



Technical service for you

Du Pont's nationwide staff of technical field men is ready to assist you whenever you ask for help. They're backed by a 2-million-dollar Sales Technical Laboratory in Wilmington, Delaware. All lab facilities are at your disposal. For more information on Du Pont electroplating chemicals and timesaving processes, call your nearest Du Pont representative (see below).

E. I. DU PONT DE NEMOURS & CO. (INC.)
ELECTROCHEMICALS DEPT.,
SODIUM PRODUCTS DIVISION
WILMINGTON 98, DELAWARE

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

For more data circle 320 on Postpaid Card

Simmons Plating puts "more drive" into crankshafts with Mutual Chromic Acid

Simmons Plating Works, Atlanta, Ga., adds years of service to crankshafts for rebuilt engines by hard chrome plating with Mutual* Chromic Acid. Famed throughout the Southeast as "Mr. Chrome," Simmons attributes its success to high standards, skill and Mutual Chromic Acid.

Mutual Chromic Acid is always 99.75% pure —or better. Its consistently low sulfate content helps Simmons control the acid-sulfate ratio of their plating bath. This safeguards against plating difficulties—and expensive rejects!

To learn more about the Mutual line of chromium chemicals, write for your free copy of Solvay's 80-page Technical Bulletin, "Chromium Chemicals." Our Technical Service staff will gladly answer your questions. State whether you would like to have a representative call.

SOLVAY® & MUTUAL PRODUCTS FOR PLATERS

Chromic Acid • Caustic Soda • Hydrogen Peroxide • Methylene Chloride • Sodium Chromate • Sodium Bichromate

Allied Chemical

SOLVAY PROCESS DIVISION
61 Broadway, New York 6, N. Y.

For more data circle 321 on Postpaid Card

ULTRASONIC CLEANING

CUTS REJECTS TO LESS THAN 1/4%

A rack of precision reflectors is removed from a side-mounted ultrasonic tank at the Foremost Manufacturing Co.

Mr. Herb Schiller of Foremost Manufacturing Co., Maplewood, N. J., manufacturers of precision metal reflectors states: "Since we installed Branson ultrasonic cleaning equipment our rejects have been reduced from 8% to less than 1/4%. Our ultrasonic cleaning equipment is extremely reliable. Branson's excellent service has certainly helped to make our operation even more efficient."

Ultrasonic cleaning achieves a high degree of cleanness far beyond the range of other methods. Although cleanness is still important, there are additional advantages to ultrasonic cleaning. These are:

- Reduced cleaning time
- Cost reduction through labor savings
- Process simplification

Whether your products are small or large, simple or complicated, you owe it to yourself to investigate the use of ultrasonic equipment for your company. Branson's highly experienced, factory-trained specialists stand ready to assist you anywhere in the U. S. Tell us about your particular problem and Branson's engineering department shall try to find the **best** possible solution in the **shortest** possible time.

SINCE 1946 — THE RESPECTED NAME IN ULTRASONICS

BRANSON INSTRUMENTS, INC.

Ultrasonic Power Division

26 Brown House Road, Stamford, Conn.

For more data circle 322 on Postpaid Card

Don't throw it away! **RECOVER**

YOUR ALUMINUM BRIGHT DIP SOLUTION

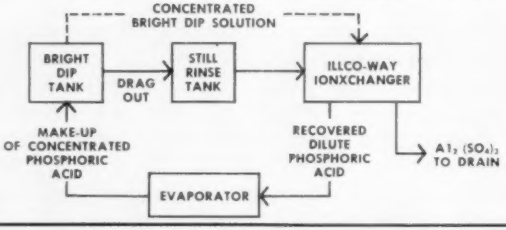
ILLCO-WAY

ionXchange

SPECIALIZED EXPERIENCE SHOWS HOW TO SAVE MONEY

The use of ion-exchange eliminates the need for dumping expensive phosphoric acid. Four years of successful experience in recovery of bright dip solutions enables us to make several recommendations, depending on particular conditions. Usually, we employ a cation exchanger to purify the first rinse, recovering phosphoric acid which has been carried over from the bath by dragout. Another treatment removes aluminum direct from the bath. The use of IWT ionXchange can not only improve the uniformity of your product through better quality control in the plating, but also can be a very *profitable* investment.

PROCESS CAN BE USED IN SEVERAL WAYS



The block diagram at the left illustrates the general methods of treatment suggested above. Actually, every installation presents its own special problems — which IWT engineers are well-equipped to solve. *So, consult your IWT representative for specific suggestions.*

ILLINOIS WATER TREATMENT COMPANY

840 CEDAR STREET
ROCKFORD, ILLINOIS

NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Ont.

For more data circle 323 on Postpaid Card

COLORS for ANODIZING

Deep Jet Black with D & H Aluminium Deep Black MLW

- **Economy of Operation**
- **Reduced Anodizing Time**
- **Remarkable Fastness to Light and Weather**

The amazing D & H colors bring to the anodizer new opportunities for color and profit. Backed by more than 75 years of experience, D & H colors for anodized aluminum are mostly homogeneous dyestuffs and rarely require buffering agents for pH adjustment.

A letter or call will bring immediate information on D & H colors for anodizing.

DURAND & HUGUENIN S.A.
BASLE, SWITZERLAND

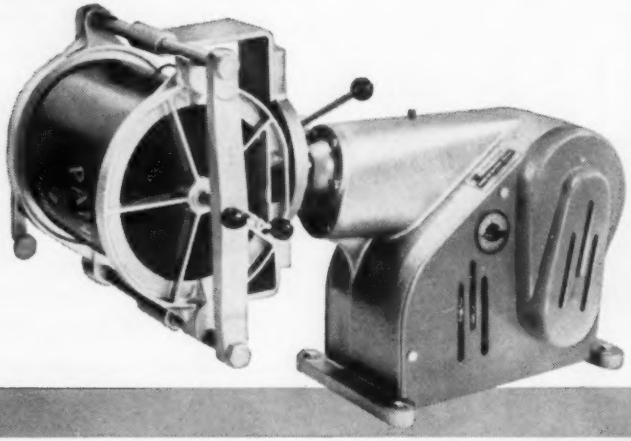
CARBIC-HOECHST CORPORATION

MOUNTAINSIDE, NEW JERSEY • Tel: ADams 2-9550

For more data circle 324 on Postpaid Card

Save time, labor and paint with a

Red Devil
PAINT CONDITIONER



No. 33 Heavy Duty
For 1 to 5 gallon cans, also carton of four 1-gallon cans. Operates vertically or horizontally. Feather-touch clutch handle. Foot-pedal release.

No. 30
For any can ¼ pint to 1 gallon, U. S. and Imperial Standard.

Red Devil—Harbil HB7
"Twin" model shakes a pair of containers . . . from ¼ pint to 1 gallon . . . same size or two different sizes.

Whether you paint your product with brush, spray or dip, you're ahead in every way when paints are *thoroughly* mixed, and nothing mixes paints better than the EXCLUSIVE 3-WAY ACTION of a Red Devil Paint Conditioner. Rejuvenates settled-out paints; insures uniform color blend of new paints. Useful for plant maintenance painting too.

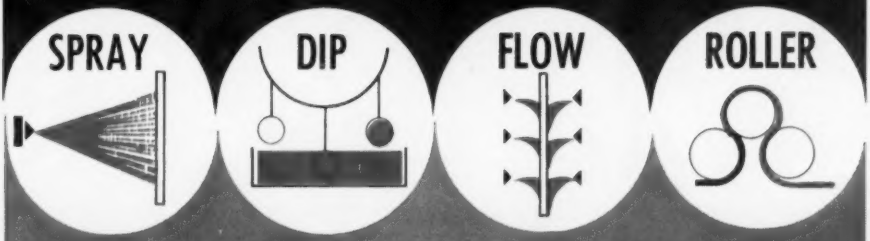
Write today for complete data. Adaptors available for containers of various shapes and sizes.

Red Devil Tools. UNION, N. J., U.S.A.

World's largest manufacturer of painters' and glazers' tools—since 1872

For more data circle 325 on Postpaid Card

For finer finishes with ANY process...

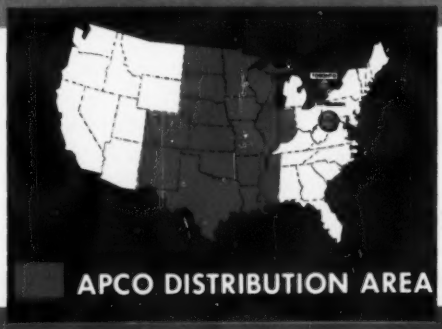


use APCO THINNERS!

For precise thinning and superior degreasing, rely on "Uniformity-Famous" APCO THINNERS. Produced from a single source of quality crude, with specialized modern equipment under close manufacturing control, APCO naphthas provide the proper balance between evaporation rate and solvency power.

Write us—the APCO Solvents man in your territory will call without obligation.

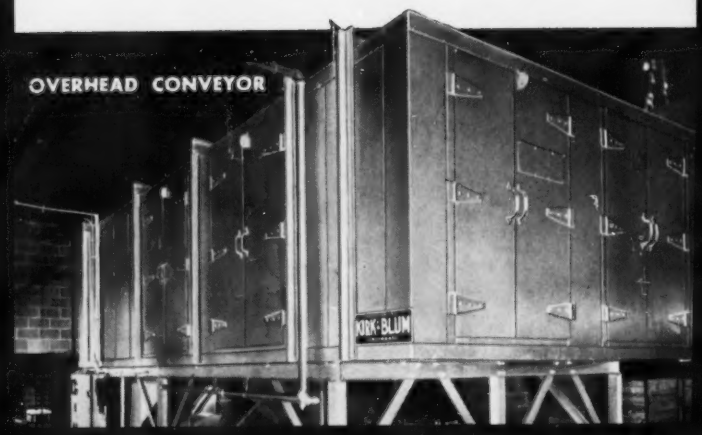
- APCOTHINNER
- TROLUOIL
- No. 10 MINERAL SPIRITS
- DRYOLENE (VM&P)
- OTHER SOLVENTS TO MEET SPECIFIC REQUIREMENTS



APCO
INDUSTRIAL SOLVENTS

APCO OIL CORPORATION
LIBERTY BANK BUILDING
OKLAHOMA CITY, OKLAHOMA

For more data circle 326 on Postpaid Card



what type OVEN do you need?

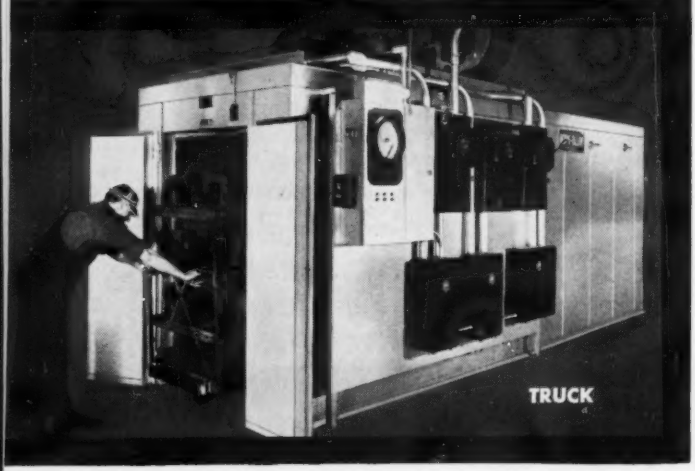
KIRK AND BLUM INDUSTRIAL OVENS

Your oven needs . . . large or small, batch or conveyorized production, for drying, baking or dehydrating . . . can be filled by KIRK & BLUM.

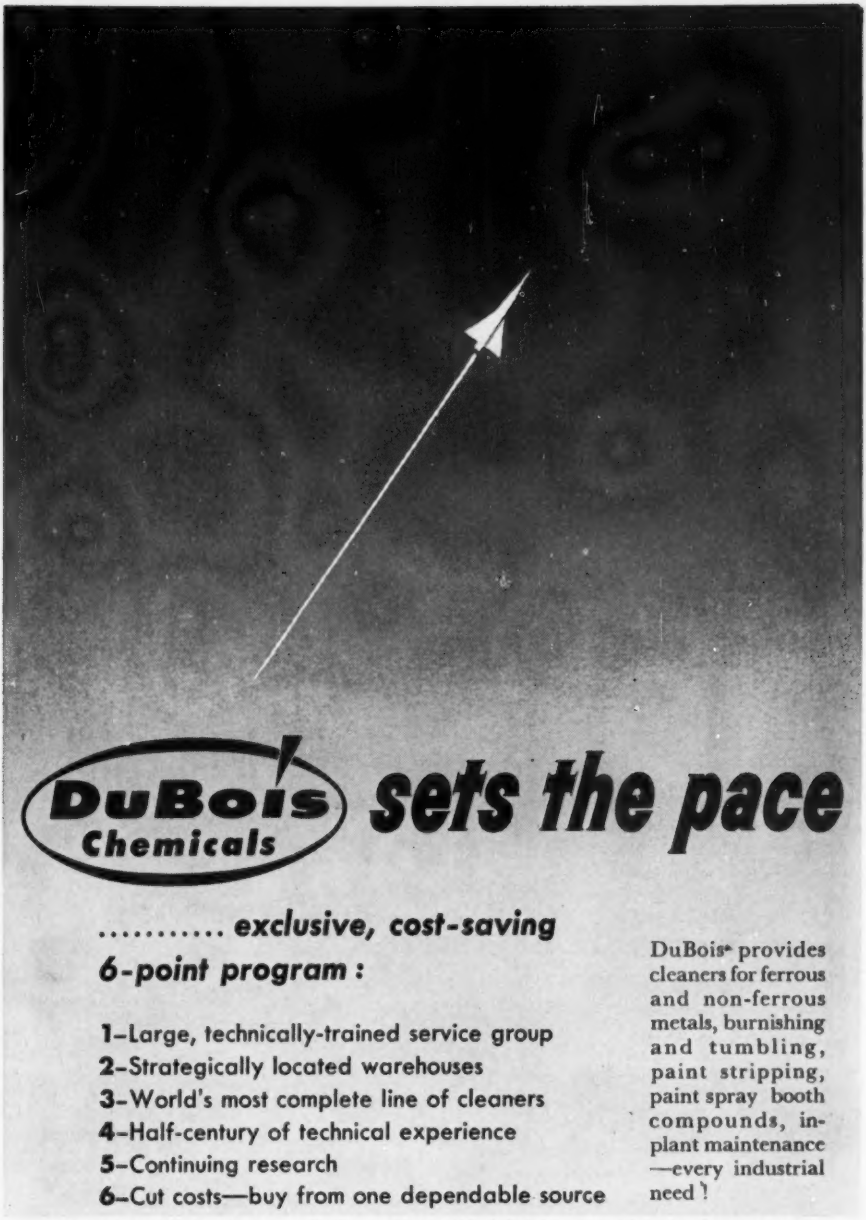
Compactly designed and expertly engineered to meet specific requirements, these typical installations show the wide range of KIRK & BLUM experience over more than 50 years. Often, ovens up to freight car size are shipped assembled, ready to operate.

Put this skill and experience to work on your industrial oven problem. For complete information and booklet, write: The Kirk & Blum Mfg. Co., 3116 Forrer St., Cincinnati 9, Ohio.

For more data circle 327 on Postpaid Card



KIRK & BLUM INDUSTRIAL OVENS



..... *exclusive, cost-saving*
6-point program:

1–Large, technically-trained service group
2–Strategically located warehouses
3–World's most complete line of cleaners
4–Half-century of technical experience
5–Continuing research
6–Cut costs—buy from one dependable source

DuBois provides cleaners for ferrous and non-ferrous metals, burnishing and tumbling, paint stripping, paint spray booth compounds, in-plant maintenance —every industrial need!

See Us at Plant Maint. and Eng. Show, Philadelphia, Jan. 22, 25, Booth 1110

DuBOIS CHEMICALS • CINCINNATI 2, OHIO

For more data circle 328 on Postpaid Card

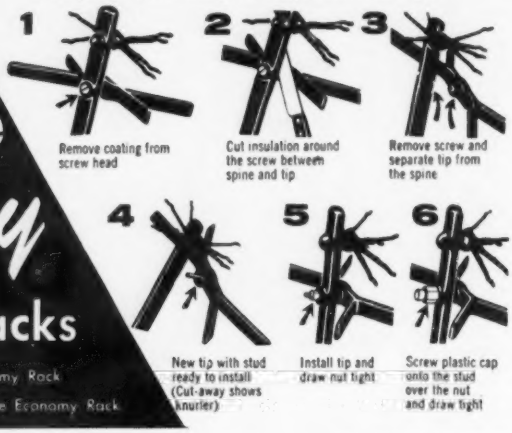
New Heavy Duty Convertible Economy Plating Racks

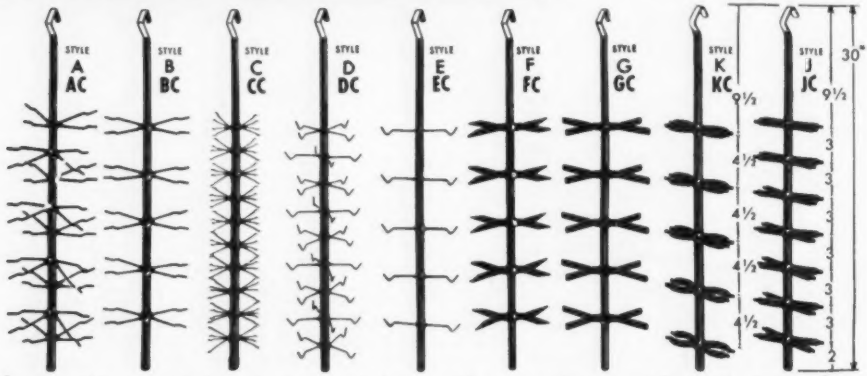
from fixed tip to replaceable tip

One letter designates Non-convertible Economy Rack

Suffix "C" designates Heavy Duty Convertible Economy Rack

Leakproof Mounting of Replacement Tips


1
Remove coating from screw head
2
Cut insulation around the screw between spine and tip
3
Remove screw and separate tip from the spine
4
New tip with stud ready to install (Cut-away shows knurler)
5
Install tip and draw nut tight
6
Screw plastic cap onto the stud over the nut and draw tight



①A $5.78	B $4.77	C $6.00	D $5.83	E $4.42	F $5.84	G $5.69	K $5.75	J $6.50
②AC 6.95	BC 5.77	CC 7.35	DC 6.95	EC 5.20	FC 6.95	GC 6.95	KC 6.95	JC 7.85

Carried in Stock for prompt shipment

*36 inch lengths also available.

Furnished to meet special spacing requirements, at a small increase in cost.

① Cat. No. and Prices of Non-Convertible Economy Racks.

② Cat. No. and Prices of New, Heavy Duty, Convertible Economy Racks.

All prices F. O. B. Chicago, subject to change without notice.

Add $1.50 packing charge on orders for less than 12 racks.

Developed in response to widespread demand for Economy Racks that could be kept at 100% capacity through endless years of use. These NEW Convertible Economy racks have special rivited tip assembly that is easily removed for replacement with pre-insulated, self-sealing THINKER BOY Tips.

The Convertible Economy Rack Spines are 25% heavier. Quality construction—mass production economies make possible the low prices.

Belke MANUFACTURING COMPANY
947 N. Cicero Ave., Chicago 51, Ill.
EVERYTHING FOR PLATING PLANTS

For more data circle 329 on Postpaid Card

ANOTHER NORTON PRODUCT

BEAR-TEX wheels, rolls and sheets are 6 ways better for hundreds of finishing jobs!

1 FINISH: BEAR-TEX gives you a smoother velvet finish on all dull-rub and satinning applications — metals, wood, plastics.

2 ECONOMY: BEAR-TEX is thrifty — no waste. Outlasts and outproduces other finishing materials.

3 HANDLING: BEAR-TEX is easy on the hands. No pricking fingers. No metallic slivers. No debris.

4 VARIETY: BEAR-TEX gives you choice of finishing grain — garnet, aluminum oxide, or silicon carbide.

5 WATERPROOF: BEAR-TEX won't rust. Completely waterproof — can be used with water, rubbing oils and compounds, or dry. Washable, too.

6 SAFETY: BEAR-TEX is non-conductive — can be used safely around electrical installations.

FOR MORE INFORMATION

A new brochure, "Better Finishing Today" is now available showing many successful BEAR-TEX applications on metal, wood and plastics. Write Dept. PF-12, Behr-Manning Co., Troy, N. Y., a division of Norton Company.

BEAR Abrasives

For more data circle 330 on Postpaid Card

THIS MONTH *in PF...*

WORRYING ABOUT RUST is common in many finishing shops. But usually the major concern is about the rusting that occurs after finishing —in service. At Globe-Wernicke Co., however, office-furniture parts often take on an unattractive reddish-brown hue even before they get to the finishing department. A new system that includes an out-of-the-ordinary solution to this problem is described in the article beginning on page 36.

THOSE RED AND YELLOW WAVES ON THE FRONT COVER of this issue call your attention to an article about sound waves of the ultrasonic variety. The waves aren't really red and yellow. They're invisible, in fact. And you can't hear the sound. But invisible and unhearable as it is, ultrasonic cleaning does some amazing jobs. Cleaning parts that couldn't be cleaned before. Blasting loose tenacious soils without harming delicate parts. Getting into holes and crevices. General Motors man Richard W. Thomas delves into the subject in the article beginning on page 44—*Ultrasonic Cleaning: Theory and Application.*

ASK THE MAN WHO OWNS ONE. It's still a good slogan, even though the Packards are getting pretty scarce. On page 82 you'll see a group of finishers asking the men who own one or more—barrel plating machines, that is. We think their answers to common problems and their discussion of their own experiences in barrel plating have resulted in an article packed with practical suggestions. See *Barrel Plating Problems.*

FROM ROCK'N ROLL RECORDS TO ROCKET SHIPS, electroforming plays an important part in modern-day industrial technology. An excellent technical program on this interesting electrodeposition process will run for a couple of days during A.S.T.M. Committee Week next February in Dallas, Texas. Aside from the fact that Dallas sounds like a nice, warm place to be in February, the technical program looks to be outstanding. Well-known, well-versed speakers. Carefully chosen topics. Opportunity for discussion and questions. The complete program for A.S.T.M. Committee B-8's two-day session begins on page 163.

NEW CATALOG!

udylite ultrasil rectifiers and electrical equipment

Just released—a comprehensive catalog on the brand new Ultrasil Rectifier line and other Udylite Electrical Equipment! It's loaded with complete information on the many revolutionary Ultrasil features . . . the new Ultrasil Junior Models . . . integral and remote controls . . . automatic and special controls . . . rheostats and switches.

This new catalog shows you feature by feature why Ultrasil Silicon Rectifiers provide maximum efficiency, economy and reliability on all electroplating operations. You'll see, too, why Ultrasil represents the first major breakthrough in design, construction and performance of silicon rectifiers. Send for your free copy today!

Udylite

THE UDYLITE CORPORATION
DETROIT 11, MICHIGAN

UDYLITE CORPORATION, DETROIT 11, MICHIGAN

GENTLEMEN:

- ☐ Please send me your new, free catalog on Udylite Ultrasil Rectifiers and other Electrical Equipment.
- ☐ Please have your representative call to discuss new Ultrasil Rectifiers in detail.
- ☐ I am also interested in information concerning low-cost conversion of old UM and UV Rectifiers to obtain many of the new Ultrasil features.

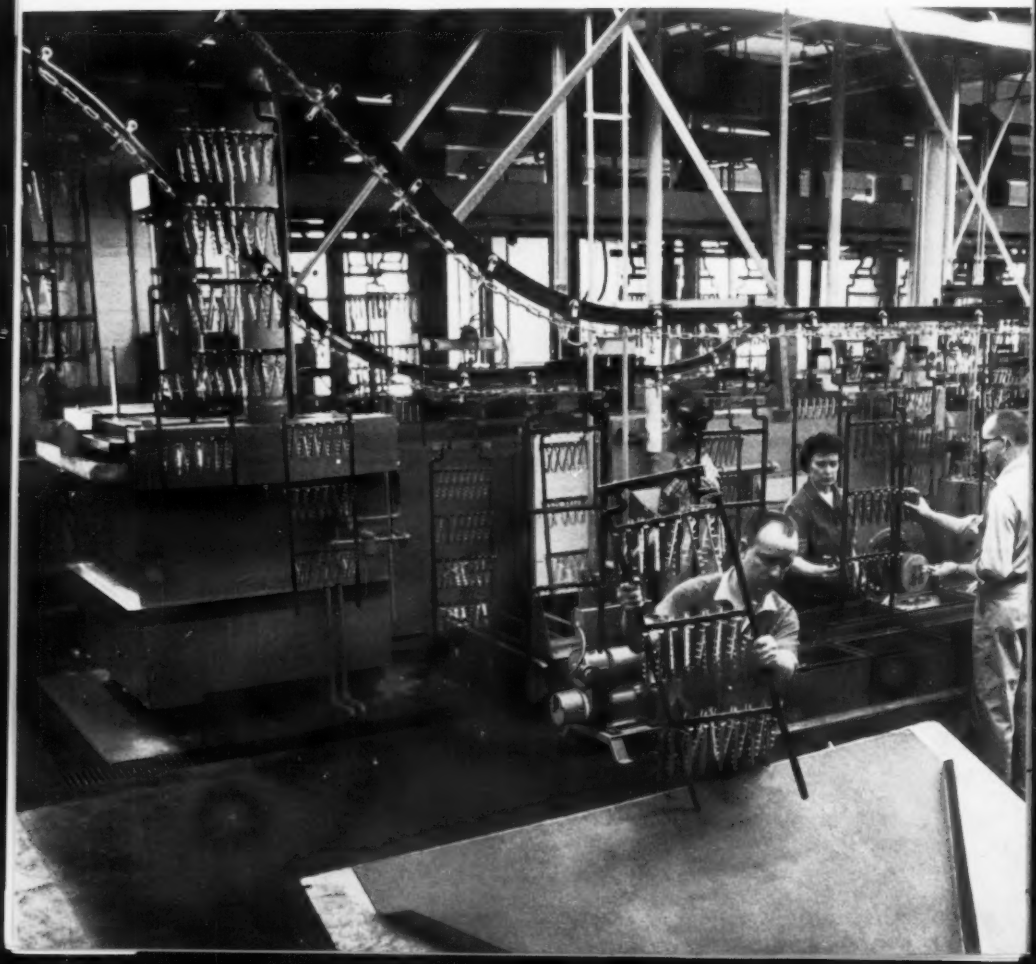
Name_____

Address_____

City_____ State_____

For more data circle 331 on Postpaid Card

here's plating automation



at its best!

Udylite Cyclemaster ties into plant conveyor system, features automatic rack loading and unloading mechanism

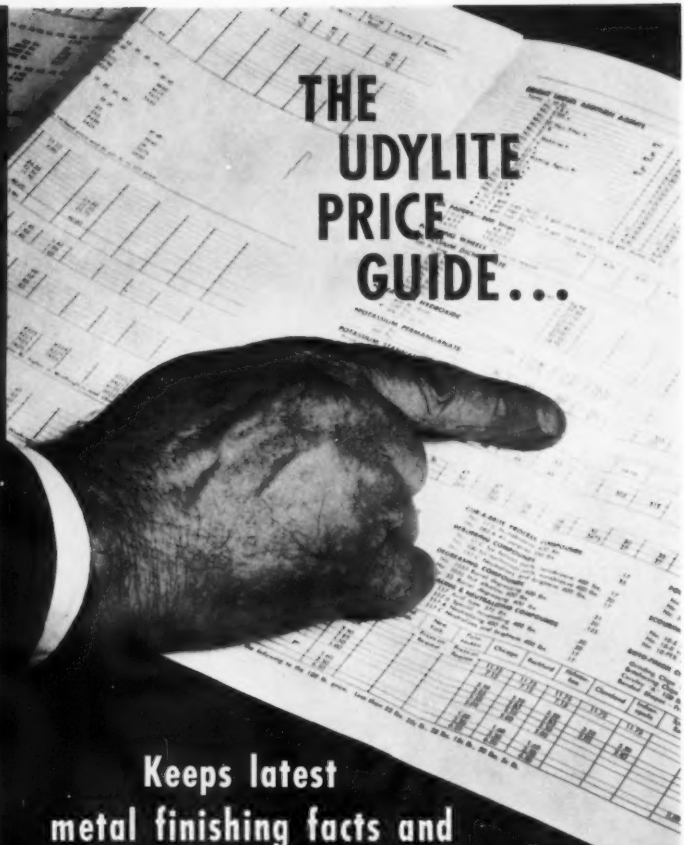
A fully-automatic Udylite Cyclemaster was selected by Koelling Metal Parts, St. Louis, Missouri, to meet high-production, high-quality plating requirements on looseleaf binder and catalog components. This 15-station machine with automatic load and unload mechanism, shown above, is tied directly into a "stop and go" overhead plant conveyor system for maximum material flow efficiency. ■ This Udylite Cyclemaster provides peak production flexibility for Koelling. It operates at any rate from 40 to 120 racks per hour with plating thickness easily varied from .0001″ to .001″. Parts of any size can be plated within the limits of the 16″ x 8″ x 36″ racks. ■ The Cyclemaster maintains exacting quality control standards, boosts plating volume and offers an important reduction in floor space requirements. To find out how you can obtain the ultimate in automatic plating today at a surprisingly low cost, call your Udylite Representative and have him tell you the complete Cyclemaster story. Then, let Udylite Engineers recommend the specific machine and conveyor system to best meet your requirements.

Udylite

THE UDYLITE CORPORATION
DETROIT 11, MICHIGAN

For more data circle 332 on Postpaid Card

udylite



THE UDYLITE PRICE GUIDE...

Keeps latest metal finishing facts and figures right at your fingertips!

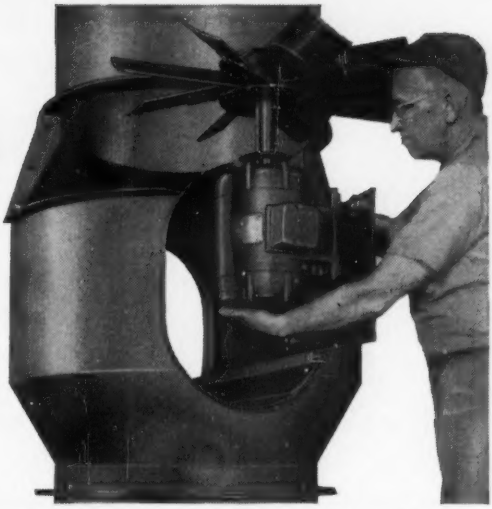
The Udylite Price Guide provides up-to-date pricing information on plating and metal finishing supplies from each of the twelve Udylite stock points. Issued bi-monthly, the Pride Guide gives you valuable market trend, information and news of latest plating methods and equipment. The Price Guide is another free customer service from Udylite. And, if you are not already a subscriber, we will be happy to add your name to our mailing list. Write today.

The Udylite Corporation
Detroit 11, Michigan

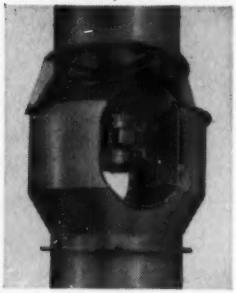
For more data circle 333 on Postpaid Card

SLIDE-OUT* MOTOR AND FAN

cut your maintenance costs



Removal of the patented half-section of cone (below) allows motor and fan assembly to slide on rails (illustrated right) out of the DeBothezat Bifurcator for quick, easy inspection and maintenance. Bifurcator housing, originally installed as a section of the ductwork, remains in place. This ease and convenience results in a saving of labor which cuts inspection and maintenance costs.



DIRECT DRIVE CUTS COSTS, TOO

Direct drive eliminates inefficiency and maintenance problems of belts, yet motor operates in cool, clean air. Twin ducts of Bifurcator carry abnormally hot, corrosive or explosive fumes AROUND motor, isolate it from fumes handled by fan. Fan wheels available from 12″ to 48″.

**Optional extra. Patents Pending.*

AMETEK **DeBOTHEZAT FANS**
A DIVISION OF AMETEK, INC.

DeBOTHEZAT FANS, Dept. PF-1261
A Division of AMETEK, Inc. • EAST MOLINE, ILLINOIS
Please rush complete information on all sizes, types and models of Bifurcators.

NAME _____

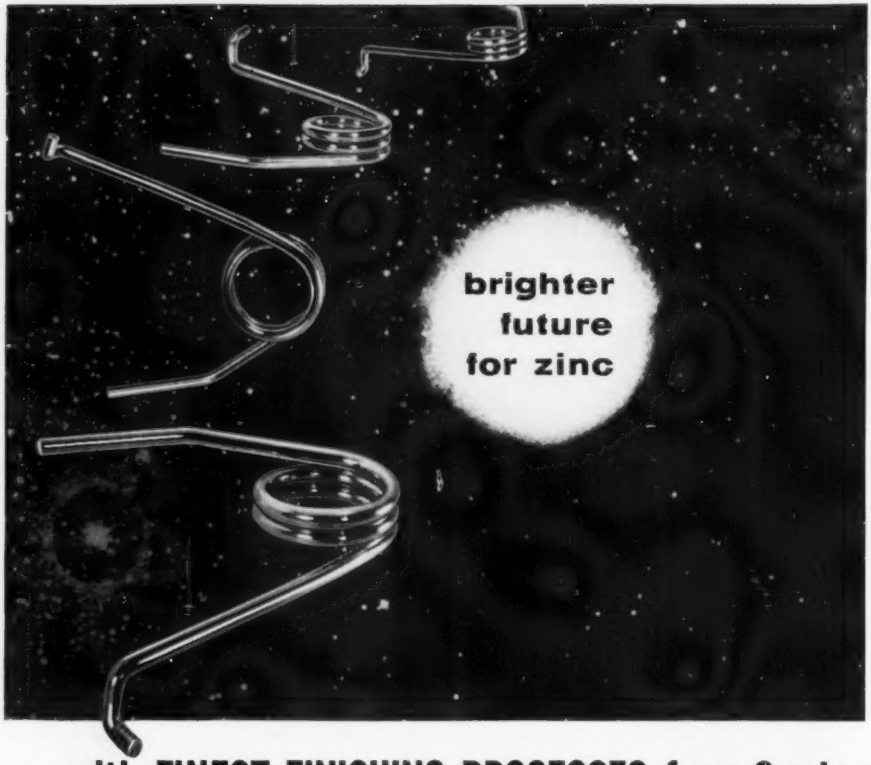
TITLE _____

FIRM _____

ADDRESS _____

CITY & ZONE _____ STATE

For more data circle 334 on Postpaid Card



...with FINEST FINISHING PROCESSES from Cowles

Looking for better zinc plating results? . . . Cowles has a complete line of zinc brighteners that provide all degrees of lustre from high brilliance to soft satin to give a new look to your products, speed up processing and produce more uniform results.

Cowles' complete plating services go far beyond zinc brighteners. You can depend on Cowles products and processes for every phase of cleaning, phosphating, conversion coating, coloring and final protection. Your Cowles Technical Man can demonstrate immediate improvement in your own operation with Cowles Finest Finishing Processes. Take advantage of it – call Cowles today!

Ask your Cowles Technical Man about these brighteners . . .

for low current density cyanide zinc electroplating:

PROMAT B4
PROMAT B4M
PROMAT B105
PROMAT ZB2

for high current density cyanide zinc electroplating:

PROMAT C42

for acid zinc baths:

PROMAT AZ 6550
PROMAT AZ 6556
PROMAT AZ 6570
PROMAT AZ 6575

Cowles — **CHEMICAL COMPANY**

CLEVELAND 20, OHIO

For more data circle 335 on Postpaid Card

editorial

Cooperation and Common Sense in Waste Disposal

The discharge of contaminated waste water from electroplating plants and shops has always been a problem. Many plating plants, particularly in the 8-state area of the Ohio River Valley Sanitation Commission, have installed their own waste treatment and waste disposal facilities.

Plants in large cities which operate municipal sewage disposal plants face a somewhat different problem. If the shops police themselves by discharging only very dilute waste products into the city sewer lines, the local plant can handle this additional contamination without difficulty. The discharge of large quantities of cyanide solution or chromic acid, however, causes trouble in the municipal sewage disposal plant. Such an incident tends to incriminate the entire plating industry, and may result in stricter local regulations.

A happy example of excellent cooperation between a group of electroplaters and a municipality is reported in the November issue of the "Bulletin" of the Masters' Electro-Plating Association, Inc. In a letter to A. T. Marinaro, executive director of M.E.P.A., the acting Commissioner of the New York City Public Works Department commends the Association for its two-year program of cooperation with the New York City Wastes Control section. This program has resulted in an overall decrease in the concentration of toxic substances discharged by membershops. The letter further points out that there has been no indiscriminate massive dumping of spent toxic metallic solutions.

Mr. Marinaro, in commenting on this letter to M. E. P. A. members, comments that the association pioneered a movement of cooperation with the New York Department of Public Works so that each might understand the common problem of the disposal of toxic waste. Mr. Marinaro commends his members for their excellent self-policing "Good Housekeeping Program" and emphasizes the fact that the effort must be continued, and extended to include shops which are not members, so that a further overall improvement in waste disposal may be realized.

Platers with a current or potential problem of this nature may well take a leaf from M. E. P. A.'s book.

Ezra A. Blount

—EDITOR

Prepaint Process Removes Light Corrosion

By EZRA A. BLOUNT
Editor

Local atmospheric conditions caused light rusting of formed steel parts in storage. Before painting, additional steps were required to remove this rust. Now an extra stage in the company's new washing machine automatically removes the rust . . .

Globe-Wernicke Company recently solved a persistent problem in its finishing department, where light rust developing on formed steel parts in storage had long caused headaches for supervisors. To prevent rejects, the light oxide film had to be removed before painting the parts for Globe-Wernicke office furniture, and this required additional time and labor.

When the Cincinnati, Ohio company decided to install a new cleaning and metal-preparation machine, elimination of this problem was one of the objectives.

Engineers found that pickling in phosphoric acid does an

MODERN, ATTRACTIVE OFFICE FURNITURE *is produced in this Globe-Wernicke plant.*

effective job of removing the light rust. Therefore, the new washer has a phosphoric-acid pickling stage in addition to the usual cleaning, rinsing and phosphatizing stages.

Built along the outside wall of the plant, the new cleaning machine is designed to function in conjunction with existing painting and baking facilities.

An overhead conveyor carries parts from storage or fabrication through cleaning, pickling, phosphatizing, painting and baking operations on two floors.

Loaders hang parts on the conveyor at 16-inch intervals in the sequence required by the assembly department (all the parts needed to make a certain desk, for instance, would be grouped together in the order needed).

The conveyor is loaded on the second floor, moves at 14-16 f.p.m. through the various operations, beginning with a trip through the spray washer (Figs. 1 and 2).

The 178-foot-long tunnel-type washer is on the first floor. Designed in cooperation with John Merkle of Globe-Wernicke and installed by Cincinnati Cleaning & Finishing Machinery Co., it performs the following operations:

1. Spray clean in a solution of IRCO No. 10 for 1 minute. Temp. 151-156 deg. F. Spray pressure, 20 p.s.i.

2. Drain for 1 minute.

3. Hot water rinse for 1 minute. Temp. 130 deg. F. Spray pressure, 10 p.s.i

4. Drain for 1 minute.

5. Phosphoric acid spray pickle for 1 minute. 10 to 12 per cent phosphoric acid. Temp. 140 deg. F. Tunnel here is fabricated from stainless steel. A water curtain formed by spray nozzles at the entrance and exit keeps phosphoric acid from the rest of the spray cleaning tunnel. Solution is steam heated using stainless steel plate coils.

6. Drain for 1 minute.

7. Spray rinse for ½ minute, in dilute solution of soda ash. Temp., 130 deg. F. This rinse recirculates,

(continued)

Prepaint Process Removes Corrosion . . .

and is heated by steam using steel plate coils.

8. Spray phosphatize for 1 minute with Meta Bond No. 36 (International Rustproof Co.) Temp. 160 deg. F. A phosphate coating weight of 130 to 200 milligrams per sq. ft. is applied. The recirculating system includes a tank in which sludge can accumulate and be flushed out.

(continued)

Globe Wernicke— Progress and Products . . .

For nearly 80 years The Globe-Wernicke Co. of Cincinnati, Ohio, has been producing up-to-date wood and steel office equipment and office supplies, functionally designed to speed up business routine and cut overhead.

In 1882, when the present Globe-Wernicke Co. was incorporated as The Globe Files Co., office equipment was not only meager but primitive. The spindle and pigeonhole were the accepted methods of filing, although the box file had been invented in 1875. By 1880, a variation of the box file in cabinet form, called a letter file cabinet was coming into use by the larger, more progressive companies. First products of the Globe Files Co. were pigeonhole cases, box files, and letter-file cabinets.

The volume of the company's business and the number of office equipment items in its product line increased along with the changing pattern of business.

In 1899 the company acquired The Wernicke Co. of Grand Rapids after which the name of the corporation was changed to The Globe-Wernicke Co. A second, larger plant was constructed on a 14-acre site in Norwood, Ohio.

The years from 1900 until the present witnessed a series of plant expansions, acquisitions of other companies and continued growth and modification of the product line to keep pace with the office equipment industry.

The present manufacturing plant covers more than a million square feet of floor space, includes two major divisions: Paper, and Steel. More than 4,000 different products are manufactured. Leading or principal products now in production can be classified under the following designations: Echelon desks and chairs; Techniplan modular business equipment; Streamliner metal desks, tables, and credenzas; vertical filing cabinets; metal horizontal units; open shelf filing equipment, systems and supplies; metal sectional bookcases; library equipment; complete line of office accessories; visible record equipment and forms; Safeguard and standard filing systems and supplies; Cello-clip map and plan files and supplies; Verti-swing hanging folders, equipment and supplies.

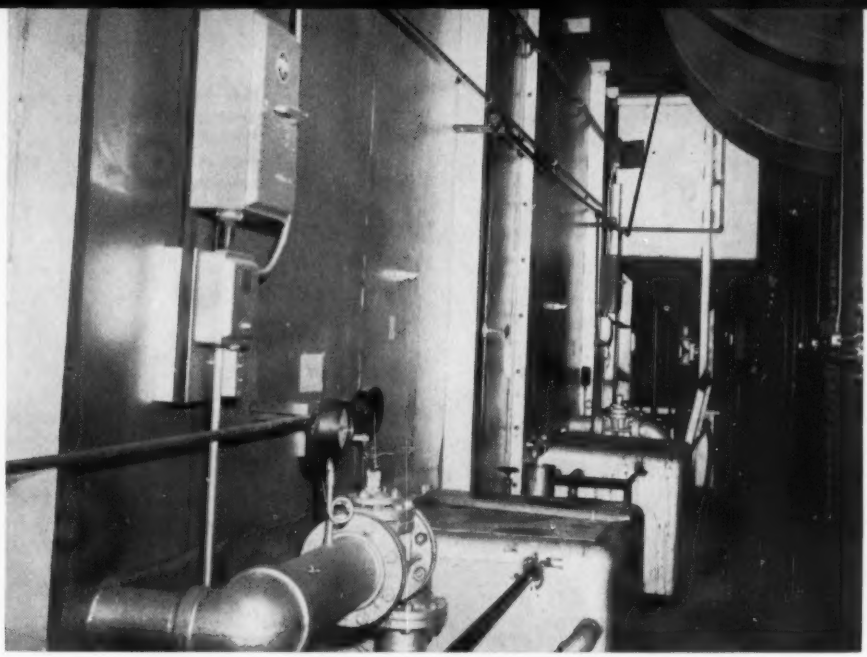
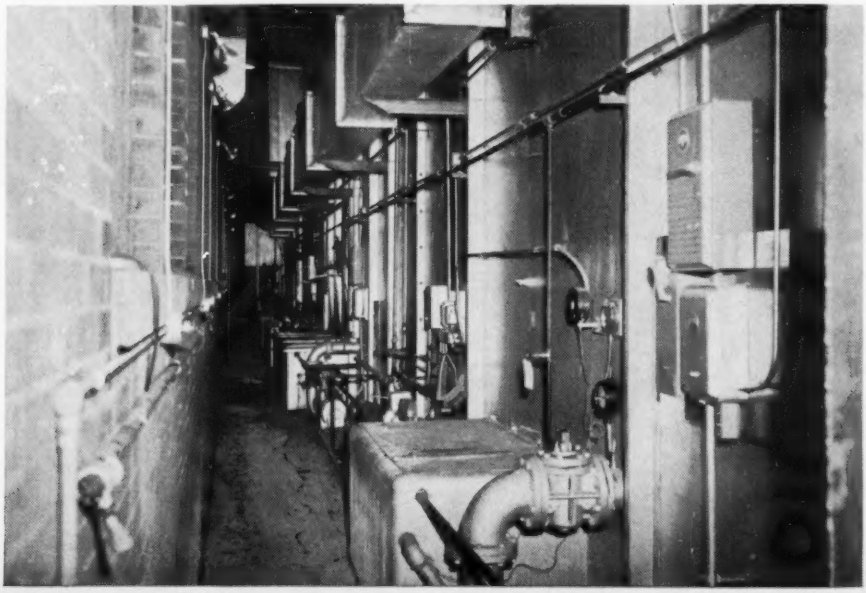


Fig. 1—Spray cleaning and phosphatizing tunnel was installed outside original plant wall (far right). In right center background is the 600-gallon sludge collecting tank which is a part of the phosphatizing unit. Sludge collected is later flushed down drain.

Fig. 2—Looking alongside the tunnel washer in the direction of conveyor travel. Tanks for solution recirculation are along floor. These tanks contain a total of 17,000 gallons of solution, which passes through the spray nozzles in the tunnel at a rate of 6,000 g.p.m. Exhaust ducts are overhead. Two 6,300-c.f.m. exhaust fans remove fumes.



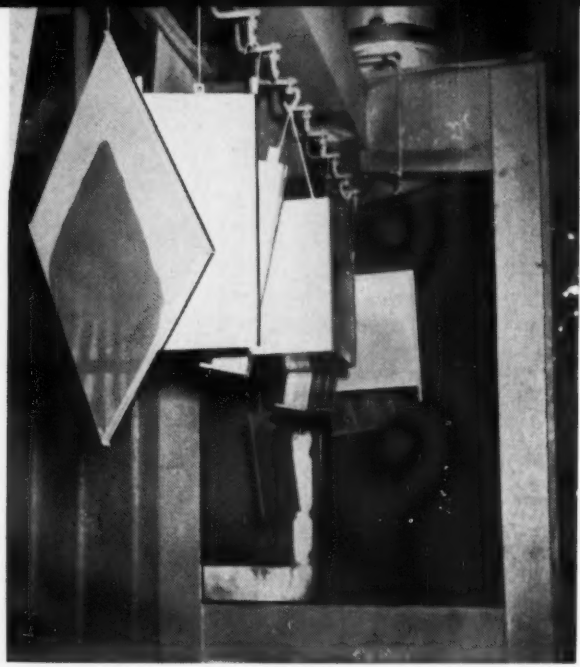


Fig. 3—Cleaned and phosphatized parts leave the tunnel washer. The conveyor then makes a tight turn and carries the parts overhead to the dry-off oven.

Fig. 4—The first coat of gray enamel is applied as desk parts pass through a 40-foot water-wash paint spray booth. Note U-shaped conveyor hooks and protecting shield below conveyor to keep dirt from dropping on painted parts. Paint is recirculated between the spray guns and the paint mixing room.

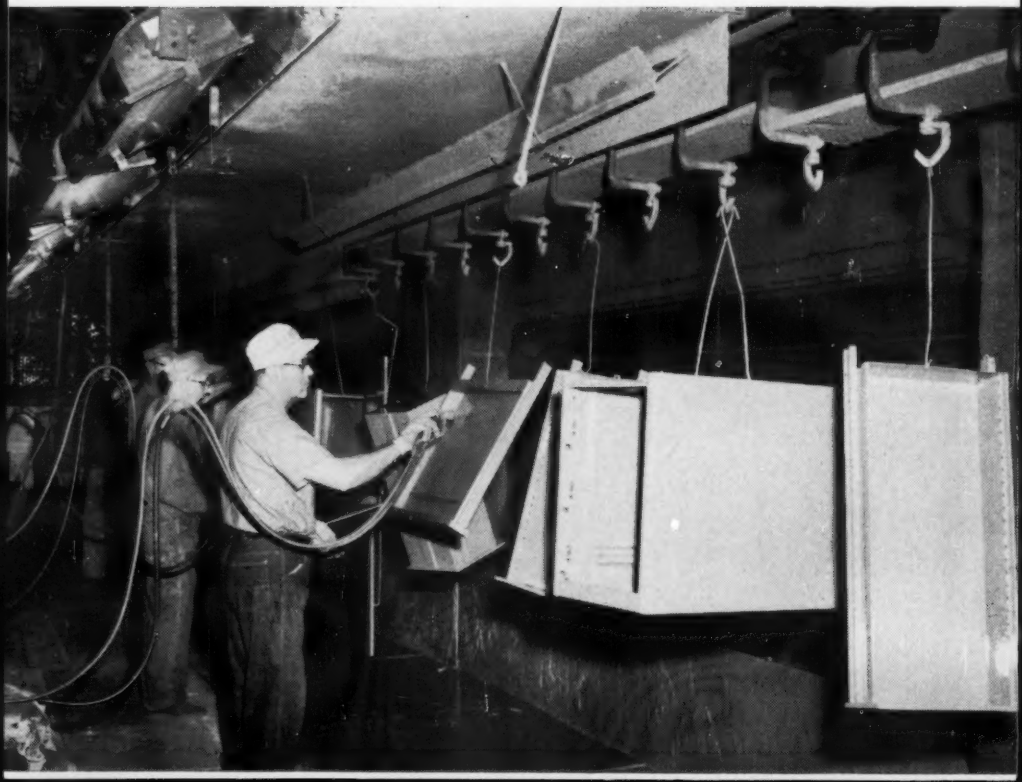


Fig. 5—Finish coated office equipment parts enter the baking oven for final baking for 20 minutes at 320 deg. Fahrenheit.

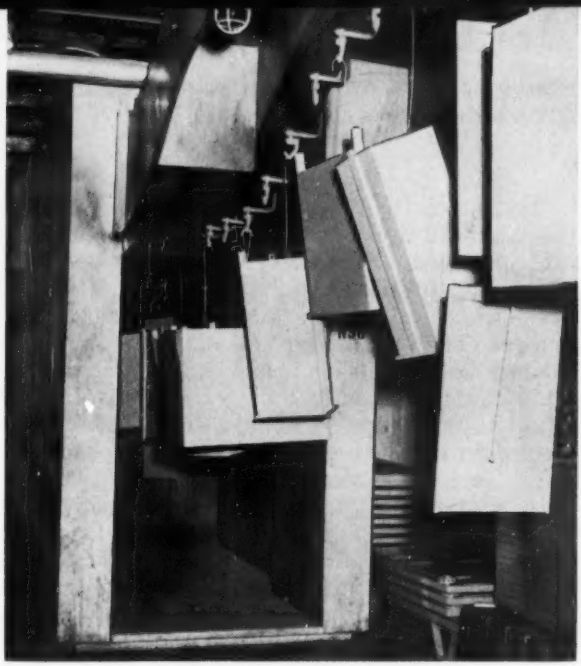
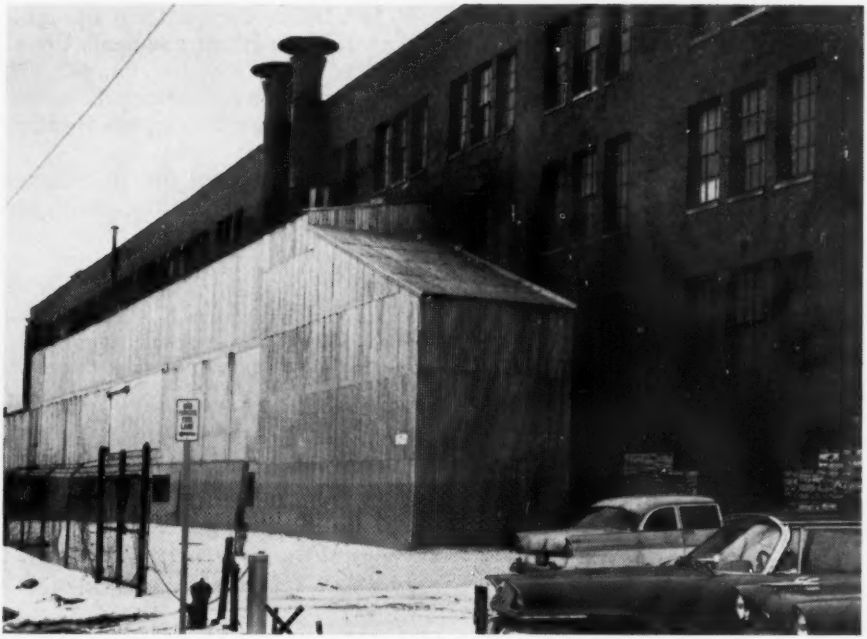


Fig. 6—Cleaning and phosphatizing machine and dry-off oven installation (made by Cincinnati Cleaning and Finishing Machinery Co.) outside one factory wall at The Globe-Wernicke Co., Cincinnati. (PRODUCTS FINISHING Staff Photographs.)



"Most of the heat for the dry-off oven is furnished by exhaust gases . . ."

9. Fogging nozzles in the tunnel keep the metal parts moist through the 1-minute drain.
10. Spray water rinse for ½ minute. This is an overflowing rinse, with some water added constantly for makeup. The water is kept warm by the residual heat in the metal parts.
11. Drain for 1 minute.
12. Spray rinse for ½ minute with a solution of 1½ per cent chromic acid. Temp. 100 to 130 deg. F. Nozzle spray pressure, 10 p.s.i.
13. Drain for ½ min. followed by automatic air blow-off.

The cleaning solution (step 1), hot rinse (step 2), and chromic acid rinse (step 12) are all heated by separate gas-fired submerged tubes or burners (Eclipse). Trerice automatic temperature controls keep temperatures of the various solutions within specified limits.

Leaving the tunnel washer (Fig. 3), the parts circle and are carried up to a dry-off oven (parts remain in the oven for 8 minutes) 126 feet long and 6 feet wide on the second floor, directly above the washer. A hood at the oven entrance creates an air seal. Tunnel openings on both the washer and dry-off oven are 5 feet wide and 7 feet high.

Most of the heat for the dry-off oven is furnished by exhaust gases from the burners that heat the solutions for the washing machine. The dry-off oven is built directly above the washer to facilitate this arrangement. A booster gas burner on the dry-off oven maintains the temperature at 400 to 450 deg. F.

Leaving the dry-off oven, parts travel about 50 feet to a spraying station on the second floor where sound deadener is applied to the undersides of the parts.

The sound deadener air dries as the parts travel back to the first-floor spray booths (Fig. 4) for application of gray enamel on the exteriors. A central paint storage room supplies eight colors of paint to each spray booth. Special colors are taken from pressure pots in the booths.

One coat of paint is applied in a 40-foot-long water-wash booth, then the parts travel for 60 feet to allow solvent flash-off before application of the second coat in a 20-foot spray booth.

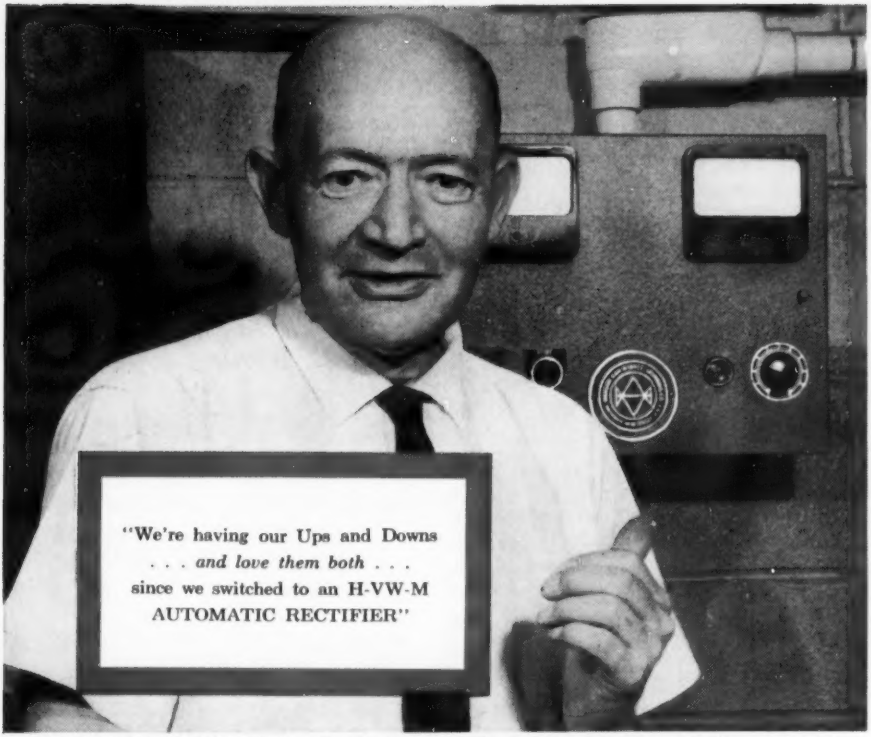
The painted parts travel another 40 feet before they enter a 140-foot-long Kirk & Blum gas-heated convection oven (Fig. 5). Paint bakes for 20 minutes at 320 deg. F. as the conveyor makes two passes through the oven.

Baked parts cool for 10 minutes on the conveyor before they are unloaded for assembly.

ACKNOWLEDGMENT

The author acknowledges with thanks the assistance of Charles Kennedy, paint supervisor, and J. R. Merkle, chief manufacturing engineer, Globe-Wernicke Co., and Robert Engle, Cincinnati Cleaning & Finishing Machinery Co. in securing the information contained in this article.

Additional copies *of this article are available as long as the supply lasts. Write PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio.*



RAYMOND PATTON, Plating Superintendent, Wilmot Castle Company, Rochester, N. Y.
Subsidiary of Ritter Company, Inc.

UP 5% goes production...
DOWN 25-30% go dial manipulations

Needs for current swing widely in chrome-plating operations of Wilmot Castle Company, makers of hospital, dental, and surgical equipment.

The Company plates some 300 different parts. With manual tap-switch rectifiers, much time was spent twiddling dials. Now . . . with the new Automatic Rectifier from H-VW-M, current is adjusted *automatically* to load. Rejects are down 5%. Plate is more uniform.

With Automatic Voltage stabilization, control is stepless, virtually infinite.

Says the plating superintendent: "Our H-VW-M unit practically thinks for itself—mostly about how to up production, cut our costs."

Whether you do chrome-plating or other kinds, contact H-VW-M for details on the most complete line of plating rectifiers featuring Automatic Voltage Stabilization.

H-VW-M *Progress in metalfinishing through advanced processes • equipment*

Hanson-Van Winkle-Munning Company, Matawan, New Jersey • Offices in Principal Cities
Alert Supply Company is H-VW-M in the West • Los Angeles • San Francisco

For more data circle 336 on Postpaid Card

Ultrasonic Cleaning: Theory and Application

Effect of frequency, filtering, cleaning solution, type of transducer, positioning of parts . . .

By **RICHARD W. THOMAS**
Diesel Equipment Division
General Motors Corporation
Detroit, Mich.

Until a few years ago, ultrasonic cleaning was a laboratory curiosity. Applied research plus experience gained in its application and improvements made in equipment have made it a technically important and economically feasible production process.

Diesel Equipment Division of General Motors now ultrasonically cleans certain close-tolerance mating components which require a high degree of cleanness ("cleanness" is preferred terminology in ultrasonic cleaning) prior to assembly.

Theory

An ultrasonic cleaning unit has three components: (a) a generator or motor alternator, (b) a transducer, and (c) a cleaning tank. The generator produces a.c. electrical energy. The transducer, coupled to the generator by a co-axial conductor, converts the electrical impulses into high frequency sound

Adapted for publication in PRODUCTS FINISHING and printed by permission from the General Motors Engineering Journal © *1961 General Motors Corporation.*

Richard W. Thomas

waves. In most cases, these are above the frequency detectable by the human ear.

The cleaning tank, usually made of stainless steel, holds the liquid cleaning agent into which the transducer transmits its sound energy.

Depends Upon Cavitation

An ultrasonic cleaning unit relies on a phenomenon known as *cavitation* to remove dirt from a part. Cavitation is the rapid collapse of thousands of microscopic bubbles within the solution. It causes rapid momentary pressure drops on the surface of the parts being cleaned, which literally blast off the dirt.

Because cavitation occurs throughout the liquid in the cleaning tank, the scrubbing action is carried into small blind holes, crevices, and grooves, if these areas are free of entrapped air.

Cavitation occurs because the transducer produces rapidly alternating plus and minus pressure waves in the liquid. Minute bubbles formed by the instantaneous pressure drop within the solution on the minus pressure wave are destroyed by the plus pressure wave.

The minus pressure wave must

(continued)

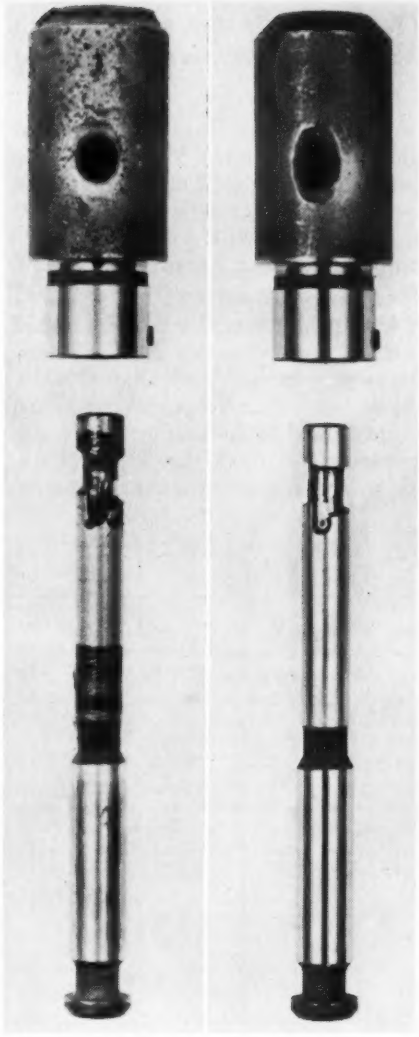


Fig. 1—Plunger and bushing components of a Diesel engine fuel injector illustrate typical results of ultrasonic cleaning applied to parts having highly finished surfaces. The photograph at the left shows a plunger and bushing contaminated with buffing, lapping, and grinding residues prior to cleaning. The photograph at right shows the same components after ultrasonic cleaning and rinsing.

"Various soils and contaminants require differing frequencies for most effective removal."

be of sufficient duration to allow the bubbles to grow to a usable size before collapsing. If frequencies are too high, the bubbles cannot reach a size which will supply any appreciable energy upon collapse.

Frequency Important

Ultrasonic sound can be divided into a low-frequency and a high-frequency range. With 50,000 c.p.s. taken as an arbitrary division point, the low-frequency range extends from 16,000 to 50,000 c.p.s. while the high-frequency range includes everything above 50,000 c.p.s.

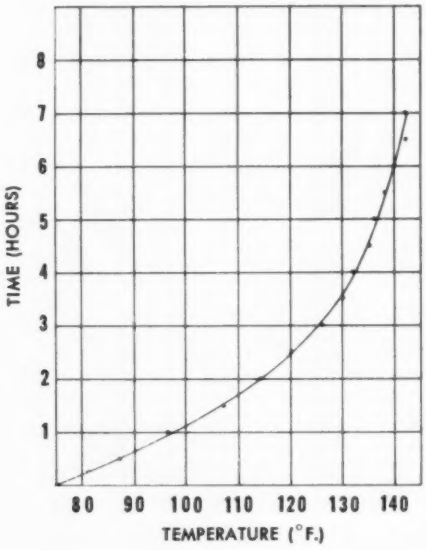


Fig. 2—Cavitation is a source of heat. This curve shows the temperature rise of a water-liquid nonionic detergent solution subjected to a frequency of 20 kc./sec. for six hours. The average power input was from three to nine watts/sq. in. of transducer surface. The capacity of the cleaning tank was 5 gallons.

Frequency is important in ultrasonic cleaning because particle displacement for a given amount of power input is inversely proportional to frequency and is much greater at low frequency than at high frequency; and because the wave length of sound in any medium, such as a liquid, also is inversely proportional to frequency.

The velocity of sound in most liquids is approximately 1.5×10^5 cm./sec. Thus at a frequency of 20 kc./sec. the length of a sound wave in a liquid is 7.5 cm. At higher frequencies, the wave length is reduced (at 400 kc./sec., it's 0.375 cm.). The wave lengths produced at various frequencies cause problems (which will be discussed).

Cavitation More Intense at Low Frequencies

Since cavitation depends upon particle displacement, it is more intense at low frequencies than at high frequencies. More power is required to produce cavitation as the frequency increases.

In any case, energy density must be high enough to cause cavitation throughout the solution. No cavitation takes place below the required energy level.

Frequencies Used for Specific Jobs Vary

Various soils and contaminants require differing frequencies for most effective removal. A specific soil may be removed easily from a small, lightweight part at one frequency but may require a different

frequency if it must be removed from a heavy part.

Further, frequency variations depend on whether or not the soil is on the surface, in a through hole, or in a blind cavity. Present-day ultrasonic cleaning units have frequencies ranging from 19 to 400 kc./sec. with some units providing multiple frequencies at both the high and low levels.

Heat Generated in Cavitation

Heat is generated during ultrasonic cleaning. Since more power is required to cause cavitation at high frequencies, more energy is expended, and therefore higher frequencies generate more heat in the solution. After several hours of continuous operation, an ultrasonic cleaning medium's heat gain reaches a plateau (Fig. 2).

In most cases, the heat generated is a useful byproduct, since cleaning solutions usually are more efficient at higher temperatures. With most liquid cleaning agents, however, cavitation is somewhat dependent upon the temperature. For aqueous-base cleaning agents, the optimum is usually 130 deg. F.-170 deg. F. Chlorinated solvents usually perform best at room temperature, but unfortunately their heat gain is quite rapid (Fig. 3). When using cleaning agents with low boiling points, temperature must be kept below the critical point by heat exchangers.

Cavitation Causes Transducer Erosion

The cavitation occurring during ultrasonic cleaning causes erosion to take place on all metal surfaces of the transducer in contact with the sonic bath. Usually, the harder

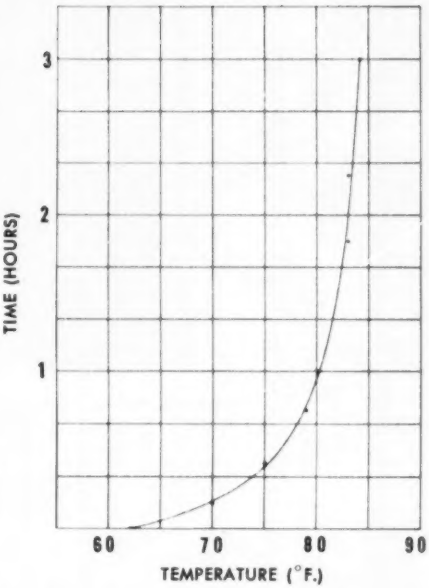


Fig. 3—Chlorinated solvents used in ultrasonic cleaning work best at room temperatures, but exhibit a rapid heat gain after continuous operation. This curve shows the temperature rise of methylene chloride irradiated at 40 kc./sec. for three hours in a tank having a capacity of 5 gallons. The average power input was 2.2 watts/sq. in. of transducer surface. The rise in temperature occurred even though a single-loop cooling coil carrying water at a temperature of 58 deg. F., was placed inside the tank of the solvent.

the metal, the slower the eroding action. This fact is used as one means for obtaining information on energy densities within cleaning solutions. By measuring the amount of metal removed from lead test plates over predetermined periods of time, rate of erosion can be determined. The greatest rate of erosion occurs where the energy density is greatest.

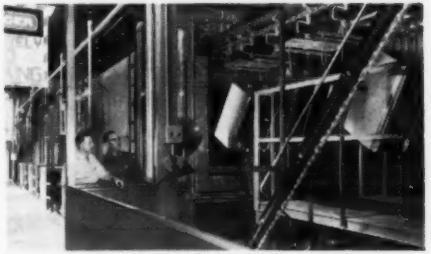
(continued on page 50)

Quality metal products deserve "the finishing touch" of Mahon

another example: Tappan's new dishwasher and famous '400 RANGE SERIES' of appliances now finished in unique COMBINATION system

For any product finishing, *"Mahon designs equipment but engineers results"*. The recently installed Mahon finishing system for Tappan fully attests to the statement. Here's equipment designed to improve quality, provide painting versatility, expand capacity, reduce material inventories and slash finishing costs. Mahon, working with Tappan plant engineers, supplied the answer—an integrated finishing system to do washing, phosphatizing, dip painting, spray painting, plasticol coating and oven baking of about 300 different parts. Floor space? It *saves* 4000 sq. ft. of production area as it has now been relocated on the plant roof. Results? A versatile, efficient system that met all requirements *and* is now saving Tappan $60,000 a year. Can you afford not to call in Mahon on your metal cleaning and industrial finishing problems?

The Tappan Co. of Mansfield, Ohio, a quality leader in the home-range field has now expanded into the dishwasher market with advanced-design, big-capacity models... finished by Mahon.



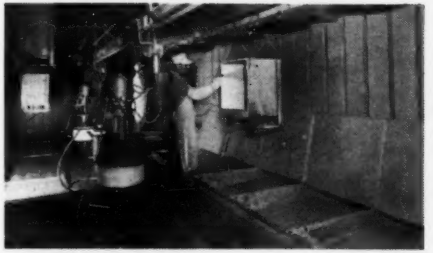
metal preparation, cleaning and phosphatizing is done in a seven-stage Mahon automatic-cycle unit.

MAHON INDUSTRIAL EQUIPMENT
• Complete Finishing Systems • Metal Cleaning Equipment • Pickling Equipment • Painting Facilities—spray, dip and flo-coaters • Drying and Processing Ovens • Special Process Equipment

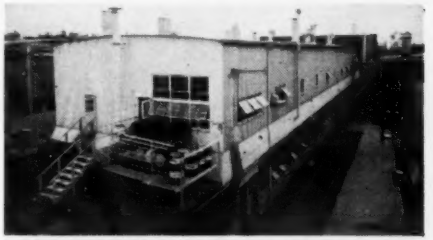
MAHON PLANT SERVICES
Steel Fabrication—weldments, machining and assembly • Structural Steel—fabrication and erection • Rolling Steel Doors—standard, Labeled and power-operated

WRITE FOR MAHON CATALOG A661.
ALSO IN SWEETS P. E. FILE.

dip coating or spray painting in same unit—dip tank is on tracks and automatically positioned.



plasticol coating is by high-pressure spray in Mahon water-wash booths with reclamation pans.



integrated system is self-housed on plant roof—made change-over easy, saved space.

THE R. C. MAHON COMPANY
DETROIT 34, MICHIGAN
MANUFACTURING PLANTS—Detroit, Michigan and Torrance, California
SALES-ENGINEERING OFFICES—Detroit, New York, Chicago, Cleveland, E. Orange, N. J., Seattle, Wash., San Francisco and Torrance, Calif.
REPRESENTATIVES in all principal cities.

YOUR BIGGEST VALUE IS IN MAHON'S PLANNING AND ENGINEERING EXPERIENCE

MAHON

For more data circle 337 on Postpaid Card

". . . transducers are made of electrostrictive or magnetostrictive materials."

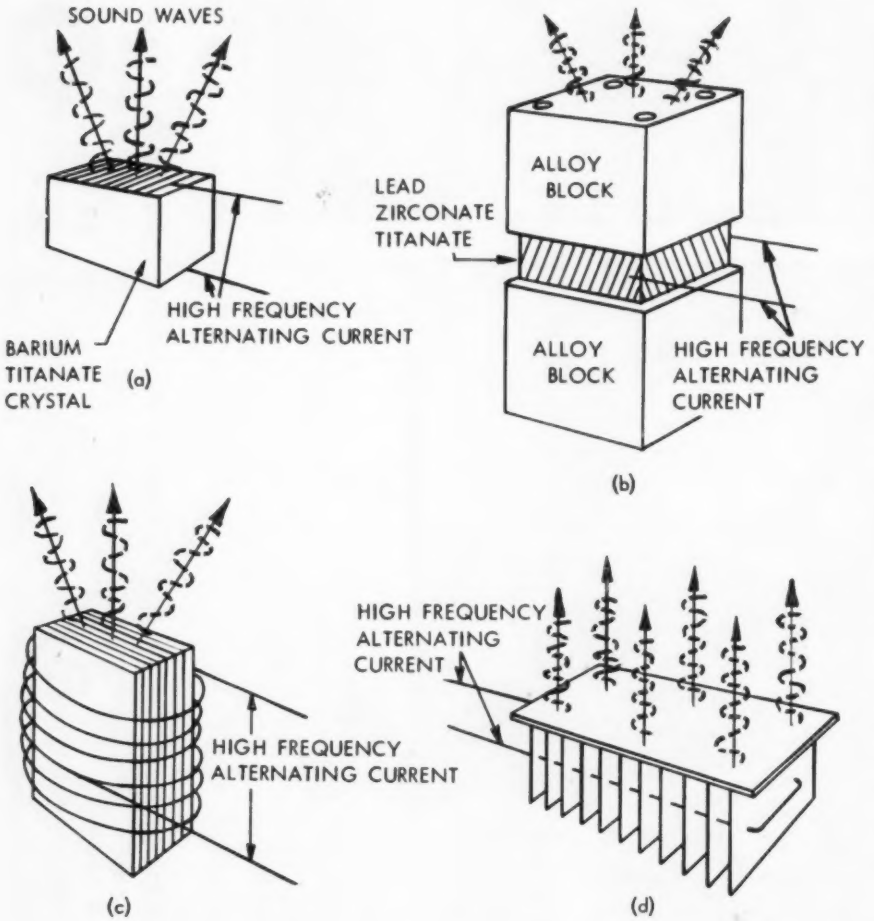


Fig. 4—The transducers used in ultrasonic cleaning transform electrical energy to mechanical energy in the form of sound waves. They are made of either electrostrictive or magnetostrictive materials. The barium titanate crystal (a) is used in the majority of electrostrictive transducers. Another type of electrostrictive transducer makes use of thin sections of lead zirconate titanate sandwiched between blocks of special alloys (b). Nickel is most commonly used as the magnetostrictive transducer material. Two types of magnetostrictive transducers are nickel strip type (c) and nickel space laminate type (d).

Two Different Materials Used for Transducers

The transducers used in ultrasonic cleaning units are made of either electrostrictive or magnetostrictive materials. The two basic electrostrictive materials used are pure barium titanate and lead zirconate titanate. The magnetostrictive material most commonly used is nickel.

Electrostrictive Transducers

An electrostrictive material expands and contracts in response to voltage alternations. The frequency at which a material having this property vibrates is primarily determined by its mass, as defined by its physical dimensions.

Some of the electrostrictive transducers used in the earliest ultrasonic cleaning units were made of quartz crystals. For approximately the past eight years, however, barium titanate crystals have been used in the majority of electrostrictive transducers (Fig. 4a).

Barium titanate crystals have certain limitations. If the crystals are made large enough to take advantage of frequencies below 40 kc./sec. their physical strength is not great enough to withstand the dimensional change and they shatter. The crystal is a relatively poor heat transfer medium. Although its Curie point (the Curie point is the temperature at which depolarization occurs, causing the crystal to stop functioning as a transducer) is approximately 240 deg. F., cleaning tanks equipped with some types of barium titanate transducers cannot be operated at liquid temperatures above 160 deg. F. Finally, the material is limited to a maximum power input of 5 watts/sq. in. because of its fragility.

Another type of electrostrictive material used is lead zirconate titanate. Because it is difficult and expensive to manufacture in heavy sections, transducer designs have been developed which use thin sections of the ceramic material sandwiched between blocks of special alloys which are positioned, machined, and dimensioned to produce a transducer which vibrates at a frequency between 20 and 24 kc./sec. (Fig. 4b).

The sandwich-type transducer, using thin sections of lead zirconate titanate has 90 per cent efficiency, compared to 70 per cent for barium titanate. It has a higher Curie point, which allows bath temperatures up to 200 deg. F. Only 10 per cent of its input energy is converted to heat, compared to 30 per cent for barium titanate. Finally, the transducer has the ability to accept and convert higher electrical input to sonic energy.

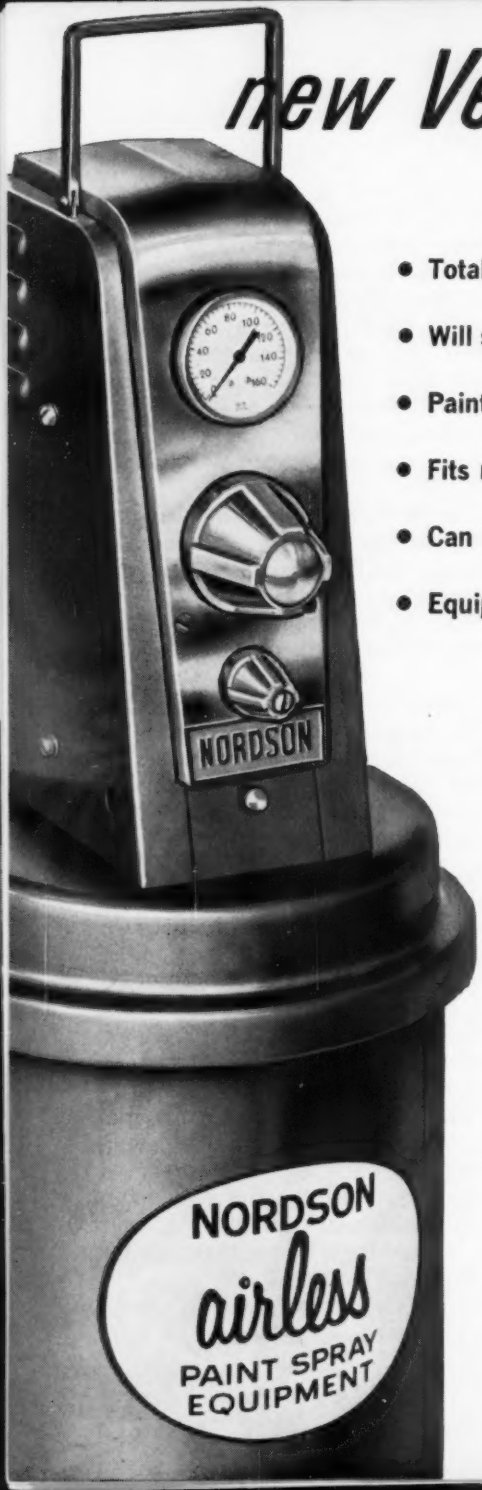
Magnetostrictive Transducers

A magnetostrictive material is one which experiences a change in length when subjected to a magnetic field. This property is exhibited by the ferromagnetic metals, iron, nickel, and cobalt and their alloys. The change in length is, of course, very small. For nickel, which is used in most magnetostrictive transducers, the change in length is approximately 30 parts in one million. At resonance, however, the change in length, which is limited by fatigue properties, may be as high as one part in one thousand.

When first introduced, magneto-

(continued on page 54)

new Versa/Spray.....



- Total weight of System 38 pounds.
- Will spray up to 30 gallons per hour.
- Paint savings average 25 per cent or more!
- Fits right on five gallon paint buckets.
- Can be used with one quart paint can.
- Equipped with Nordson Versa Gun.

FIRST

. by NORDSON

Nobody buys a ten-ton truck to do pickup truck work, yet everybody wants the rugged reliability of a big truck.

We don't build trucks; we build Airless Spray Systems, but now we offer you "ten-ton truck" reliability in a one man, single gun Airless Spray Unit.

Nordson built the first Airless Spray System. All Nordson's twelve years of accumulated knowledge is built into this new System. It is a real workhorse . . . built for rugged day-in, day-out, trouble-free **profitable** operation.

TRY IT FOR YOURSELF . . .

We will be glad to arrange for you to try this new unit free of charge. Paint your products with your coating materials in your own plant. You will be amazed at the savings and improved quality this new System can bring to your finishing operations. Write today.

NORDSON CORPORATION
88 Jackson Street • Amherst, Ohio

IN THE FIELD NORDSON airless

Widest range of Hot and Cold Airless units available anywhere. One to meet your exact needs.

For more data circle 338 on Postpaid Card

". . . there is a limitation to the amount of power, in watts, that can be transmitted into an ultrasonic cleaning bath."

strictive transducers cost more than electrostrictive transducers. Of more concern, perhaps, was the fact that early magnetostrictive transducers were only 50 per cent efficient, because of eddy currents and hysteresis losses, and that power requirements were anywhere from 100 to 200 per cent greater than for electrostrictive transducers.

In addition, the first magnetostrictive transducers generated considerable heat (part of the reason for the high power input) and required additional plumbing for a cooling system.

Magnetostrictive transducers have one distinct advantage over electrostrictive transducers — they tolerate bath temperatures of approximately 250 deg. F.

Recent developments in magnetostrictive transducer design have eliminated most of the disadvantages. They now compete favorably, both in cost and operating characteristics, with electrostrictive transducers.

The magnetostrictive transducers used today are of two basic types: the nickel strip type (Fig. 4c) and the nickel space laminate type (Fig. 4d). These units convert the entire bottom of a cleaning tank into a uniform radiating surface. They work best at frequencies below 40 kc./sec. and, therefore, take advantage of the fact that cleaning efficiency increases as the frequency values approach 10 to 16 kc./sec. They withstand heavy power levels without damage. In addition, they have high Curie points and, although they cease to function properly if bath temperatures exceed 300 deg. F., they are not damaged permanently.

The nickel space laminate type of transducer can handle power densities up to 30 watts per square inch of transducer surface. It should be mentioned, however, that there is a limitation to the amount of power, in watts, that can be transmitted into an ultrasonic cleaning bath.

Any given liquid is capable of accepting a fixed amount of power from a plain radiating surface. If this fixed input is exceeded, surface cavitation occurs in the immediate vicinity of the radiating surface. This tends to form a barrier to the energy being transmitted from the transducer and prevents cavitation of much of the rest of the bath, radically reducing cleaning efficiency of the unit.

Cleaning Agents Must Be Carefully Selected

Cleaning solutions must meet these requirements if best results are to be attained in ultrasonic cleaning:

- They must be compatible with the soils to be removed.
- They must have a relatively low vapor pressure at the working temperature of the bath.
- They must be relatively nonviscous at the working temperature.
- Their density must be approximately equal to or a little higher than that of water.

(continued)

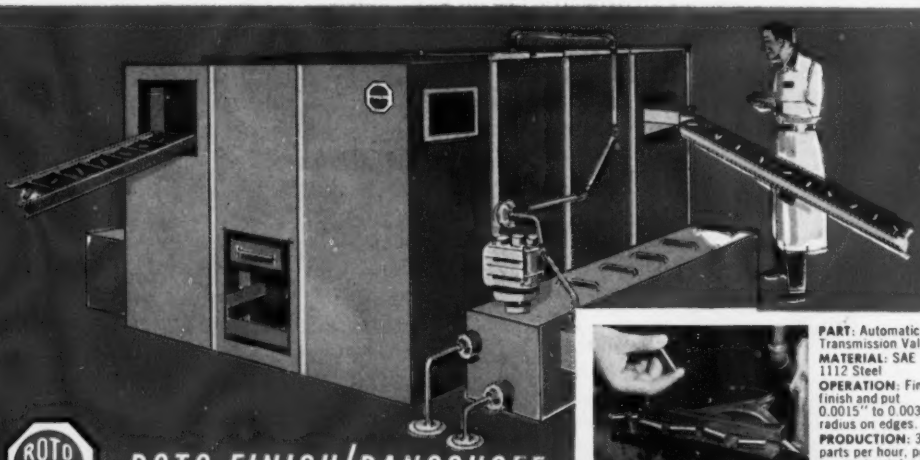
Big Savings in Automatic Finishing are now possible with the NEW AUTOMATIC VIBRATRON®

IN LARGE PLANTS OR SMALL PLANTS, for complete production flexibility, the Automatic Vibratron is available in two basic types, the Batch Automatic for batch production, and the Continuous Automatic for continuous production. Each is available in a complete range of sizes and capacities.

Automatic Vibratrons are now deburring automotive transmission valves . . . preparing zinc die castings for electrostatic painting . . . finishing golf club heads for plating . . . deburring complex, 14" long die castings . . . and final finishing precision rollers for bearings to 4 microinch smoothness.

WRITE TODAY for literature, and for details on the cost-saving possibilities of automatic finishing in YOUR plant.

For more data circle 339 on Postpaid Card



PART: Automatic Transmission Valve
MATERIAL: SAE 1112 Steel
OPERATION: Fine finish and put 0.0015" to 0.003" radius on edges.
PRODUCTION: 3,600 parts per hour, per processing tub.
FINISHING COST: Down 30%.

ROTO FINISH

ROTO-FINISH/RANSOHOFF

3700 MILHAM RD., KALAMAZOO, MICHIGAN

- They must be capable of supporting stable, standing sonic waves.

Stable standing sonic waves exist in a liquid irradiated from the bottom of a tank when the surface of the liquid is at a node—that is, at one of the odd-quarter wave lengths from the antinode or radiating surface. When a transducer is on one side of a tank, therefore, the opposite side of the tank must be located at a node to produce stable standing waves.

Many of the cleaning solutions used in industrial power-washing equipment have been applied to ultrasonic cleaning. Other heavy-duty detergents, wetting agents, and alkaline cleaners not adaptable to power washers also have proven very useful as ultrasonic cleaning agents. Such agents, by careful formulation, can be compounded to provide cleaning baths which will:

- Lower the surface tension of water to allow easy bubble formation with less expenditure of energy and, consequently, less loss of energy in heat transfer.
- Lower the inter-facial tensions existing between the dirt particles and the part being cleaned.
- Permit faster penetration of the liquid into the masses or layers of dirt as well as small holes, grooves, and cracks.
- Allow, in some cases, chemical reaction with the soils, either dissolving them directly or forming soluble soaps which are more readily solubilized.
- Aid in dispersing the dirt removed and in resisting its tendency to redeposit on the parts being cleaned.

"According to this report, we're in business now for our health!"

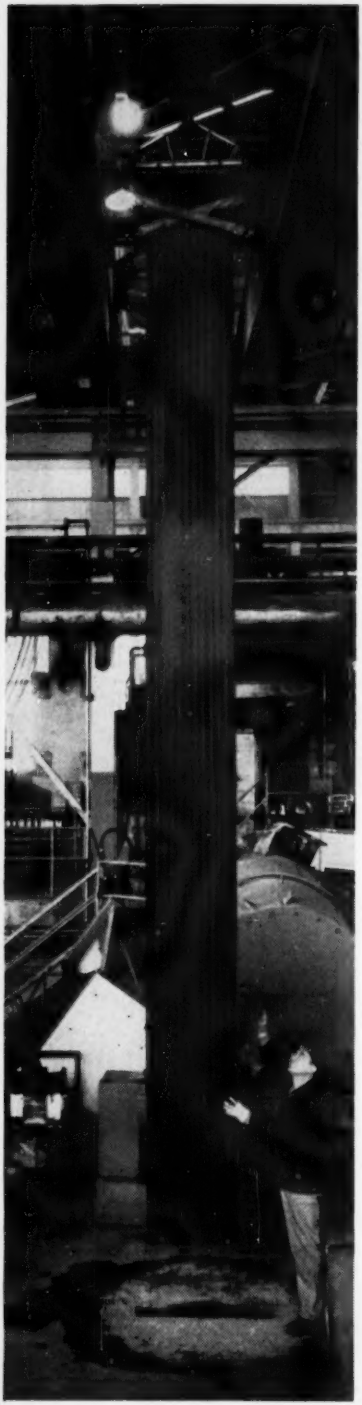
Proper Rinsing

Non-soluble soils removed from parts being cleaned remain in suspension within the fluid medium. To some extent, the non-soluble particles may be redeposited on the parts when the bath reaches a certain degree of contamination. This redeposition is more likely to occur within the top ½ inch of the bath, since cavitation, or at least cleaning efficiency, is lower within this space.

In heavily contaminated baths, some redeposition of soil may occur as the parts are removed from the bath. This is not detrimental if proper rinsing procedures follow cleaning.

If a filtering system is incorporated with the cleaning bath, rinsing is not quite so critical. Since organic solvents are usually easier to filter than aqueous solutions, ultrasonic cleaning units using organic sol-

(continued)



ASARCO-MAX ANODES

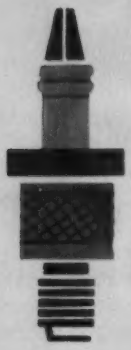
How close can you get to perfection in copper anodes?

Here you see the closest thing to perfect copper now available for electroplating purposes. This is the huge, void-free, dense cake of copper from which Asarco-Max copper anodes are cut. The patented Asarco process gives a grain structure so uniform that an inspection of Asarco-Max anodes in the plating tank, one by one, makes you think you are looking at the same anode each time you pull one out. Corrosion of the anode is uniform from the solution level down to the end, and this reduces scrap loss and down-time for anode replacement. Asarco-Max copper anodes will be cut to provide the length and weight you prefer. For additional information about our low-cost anodes, write or call Federated Electro-Chemicals Department, American Smelting and Refining Company, 120 Broadway, New York 5, N. Y.

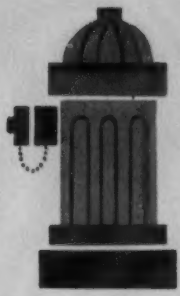
ASARCO

For more data circle 340 on Postpaid Card

from Spark Plugs



to Fire Plugs



from Misses

to Missiles

Heatbath has a complete line of tested and proven chemical finishing products for all ferrous and non-ferrous metals. This line includes materials for cleaning, etching, deoxidizing, deburring, polishing, bright dipping, chromating, conversion coatings and surface protection. We'll be glad to process samples of your products or, if you prefer, send now for further information. Our technical engineers are at your service.

HEATBATH CORPORATION

SPRINGFIELD 1, MASS. or 701 North Sangamon St., Chicago 22, Ill.

39 Years of Service to the Heat Treating and Metal Finishing Industry

For more data circle 341 on Postpaid Card

". . . dissolved gases in a fluid adversely affect ultrasonic-cleaning efficiency."

vents often have continuous-filtration systems.

Diesel Equipment Division of G. M. has found it more economical when using detergent-type baths to follow the initial cleaning with a dip rinse in an overflow bath and then return to a sonic rinse. With this procedure, the contamination level of the cleaning tank can reach a high level without affecting the cleanness of the part. When possible, recovery of the cleaning solution is accomplished by separate filtration after it is removed from the tank.

When purifying ultrasonic cleaning solutions by filtration or cascade overflow, it is important to remember that dissolved gases in a fluid adversely affect ultrasonic cleaning efficiency. Gases are removed from a fluid as the transducer begins to operate. After a few minutes, the fluid has been degassed. But if fresh fluid containing dissolved gases enters from a filtration system or overflow-purification system, the cleaning efficiency of the system may be destroyed. A flow rate of more than one or two per cent of the volume of the tank per minute is incompatible with efficient cavitation. This does not apply to chlorinated solvents, which, due to their high specific gravities, do not readily absorb gas.

De-gassing is evidenced by the streams of bubbles which rise to the surface during the first few minutes of ultrasonic irradiation. These bubbles should not be confused with other visible swirls, streams, or eddy currents found in baths being irradiated with fairly high power densities.

The volume of the transmitting fluid and its depth, temperature, viscosity, vapor pressure, and degree of contamination are all interrelated. Because of variations in these factors, some fluids do not cavitate as readily as others and consequently do not clean with equal efficiency.

Another consideration regarding volume and depth of the cleaning bath is the possibility of reflection. If the surface of the bath is too close to the diaphragm of the transducer, the energy wave will be reflected back to the diaphragm (tank bottom) with little attenuation. This action greatly accelerates erosion of the tank bottom, with its attendant maintenance problems.

Transmission of ultrasonic energy from transducer face to cleaning solution is more efficient when the face of the diaphragm is smooth and free from irregularities.

Positioning Parts

Effective cleaning can be done anywhere within the fluid medium, providing the power input is sufficient to produce the level of activity necessary for a particular cleaning operation.

Processing time may be shortened somewhat, however, if the work is located within the bath at some antinodal point—some multiple of a half-wave length above the tank

(continued)

"Proper load size is more critical at low frequency than at frequencies above 100 kc./sec."

bottom. But in practice it is rarely possible to achieve such critical positioning.

Fortunately, this difficulty in positioning can be eliminated almost completely by moving the parts through the cleaning medium in both a vertical and horizontal plane. This motion brings the parts into areas of both high and low cavitational energy. Also, physical movement of the fluid is provided over and around the parts. This aids in washing away loosened dirt.

Containers

The containers or racks used to suspend parts in an ultrasonic cleaning bath should: (a) cause minimum interference to the standing sonic waves and (b) provide accessibility of the parts to the ultrasonic irradiation.

The best practice is to suspend the parts to be cleaned from a rack, but small-size parts having a cylindrical, cubical, or spherical shape are not adaptable to racking. In these cases, it is more convenient to use containers such as baskets or beakers.

When baskets are used they should be constructed of either thin (0.010 to 0.020 inch) metal sheets, or of woven metal cloth whose openings are greater than ¼ inch or less than 200 mesh. Screening sizes falling between these size limitations cause an undesirable scattering of much of the acoustical energy reaching the container. This same effect is produced by closely packing large numbers of small parts into a container.

The scattering effect is further complicated by the fact that the vibrating action caused by the acoustical energy creates an even tighter compaction of the parts.

Proper load size is more critical at low frequency than at frequencies above 100 kc./sec. The higher frequencies have a greater power to penetrate deep recesses, and the spaces between small parts can be considered as recesses.

Early exploratory work by Diesel Equipment in applying the ultrasonic cleaning method indicated that the cleaning efficiency of a sonic bath is specifically related (a) to the mass of the part, or load of parts, being cleaned, and (b) to the time required to achieve the desired degree of cleanness.

Curves were plotted of this effect (Fig. 5) using data obtained from ultrasonic units having power input levels of 60 watts and 300 watts. The curves provided a basis for estimating the cleaning time required for larger loads, commensurate with the total acoustical energy available to us.

The experience of Diesel Equipment with the ultrasonic cleaning of fairly large numbers of small parts has been in the removal of a protective oil film along with minute residual particles from 7/32-inch and ¼-inch-diameter steel balls used as valves in hydraulic valve lifters. At present, loads of 7,500 to 10,000 pieces are being satisfactorily cleaned using a constantly filtered bath of trichloro-

(continued)

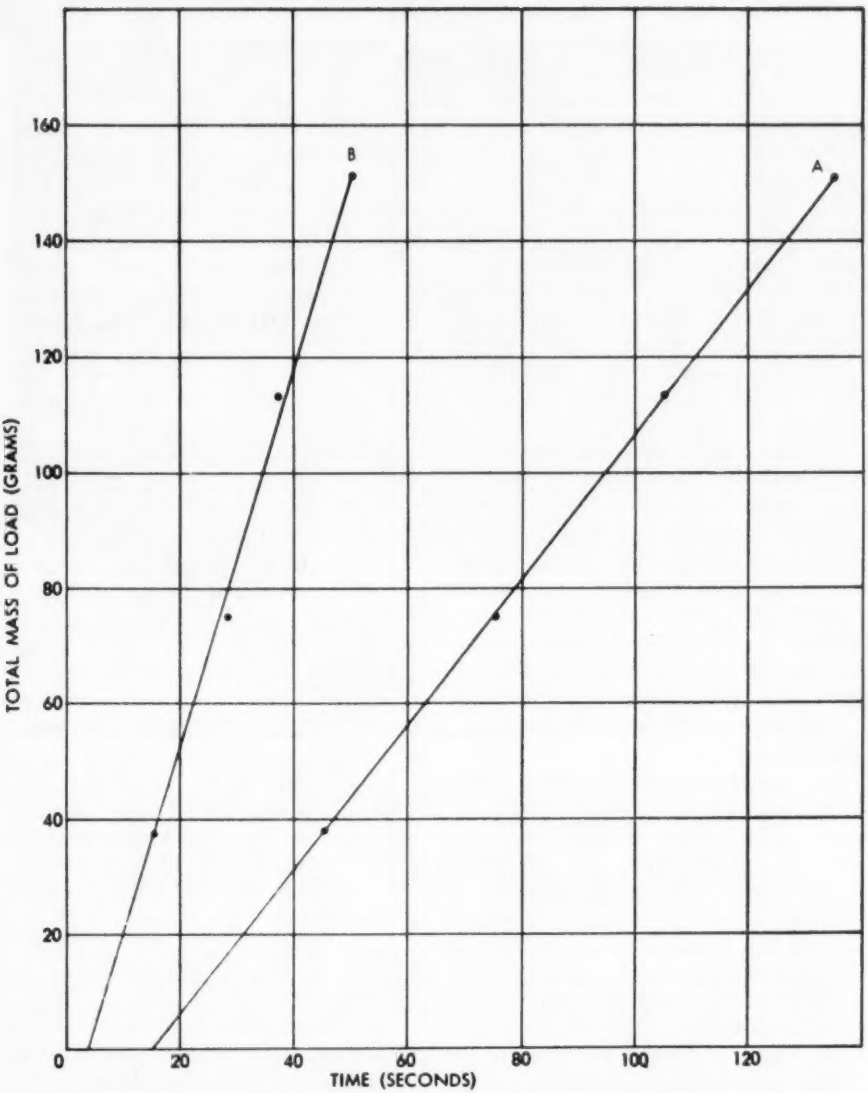


Fig. 5—This is a graphic representation of the effect of mass upon cleaning time at two levels of power input. Curve A was obtained from an input of 60 watts, which provided 1.9 watts/sq. in. of transducer surface. Curve B was obtained from an input of 300 watts, providing 2.2 watts/sq. in. of transducer surface. The volume of the ultrasonic tanks used for gathering the data was 1/2 gal. for curve A and 5 gal. for curve B. These curves are applicable only to the same bath composition, volume, and temperature at which the tests were conducted. With increased power input, the slope of the curve inclines more toward the vertical, indicating that greater levels of power input compensate for larger parts or greater numbers of parts with little increase in cleaning time.

ethylene irradiated at a frequency of 390 kc./sec. Immersion time is approximately three minutes.

The principal drawback of high-frequency cleaning, when applied to parts considerably larger than the steel spheres, is a shadowing effect which accompanies irradiations of short wave length. Low frequencies or long wave vibrations tend to reach around corners of obstacles by diffraction and eliminate shadowing. High-frequency irradiation, however, causes zones and shadowing which result in some exceptionally clean areas as well as areas quite unclean.

In some instances, the positioning of parts in relation to the standing waves is of considerable importance. Cylindrical parts are usually arranged so their longitudinal axes are parallel to the standing waves, especially if the cylindrical part has a central bore through its axis.

Summary

In a relatively short span of time, ultrasonic cleaning has developed into an important production process for meeting exacting cleaning requirements. To be most effective, however, the following factors should be considered in regard to an ultrasonic cleaning operation:

- The type and solubility of soil(s) to be removed.
- The size, shape, and weight of the parts to be cleaned.
- The number of parts to be cleaned.
- The frequency to use for effective soil removal.
- The relationship between the mass of the part, the sound energy level of the ultrasonic bath, and the cleaning cycle time.
- The positioning of parts in the container to obtain the best cleaning efficiency.

Although ultrasonic cleaning will not replace the other established industrial cleaning methods, it does have certain advantages such as the ability to:

- Clean inaccessible areas.
- Remove soil films having strongly adherent forces.
- Reduce cleaning time.
- Remove soils in the 10-micron and sub-micron range.
- Remove soils from intricate mechanisms or from parts and assemblies too delicate to clean by other methods.

BIBLIOGRAPHY

Koontz, D. E., and Amron, I., "An Ultrasonic System for Eliminating Physical Contaminants from Electron Devices," *Ultrasonic News*, (Third Quarter, 1959).

Koontz, D. E., and Amron, I., "Improved Ultrasonic Wash Methods," *Electronics*, (October 16, 1959).

Miller, Bernard E., "Ultrasonics—Silent Sound with Muscle," *Metalworking*, (August, 1960).

Platzman, Paul M., *The Primer of Ultrasonic Cleaning and Finishing*, published by the Narda Ultrasonics Corporation, 1958.

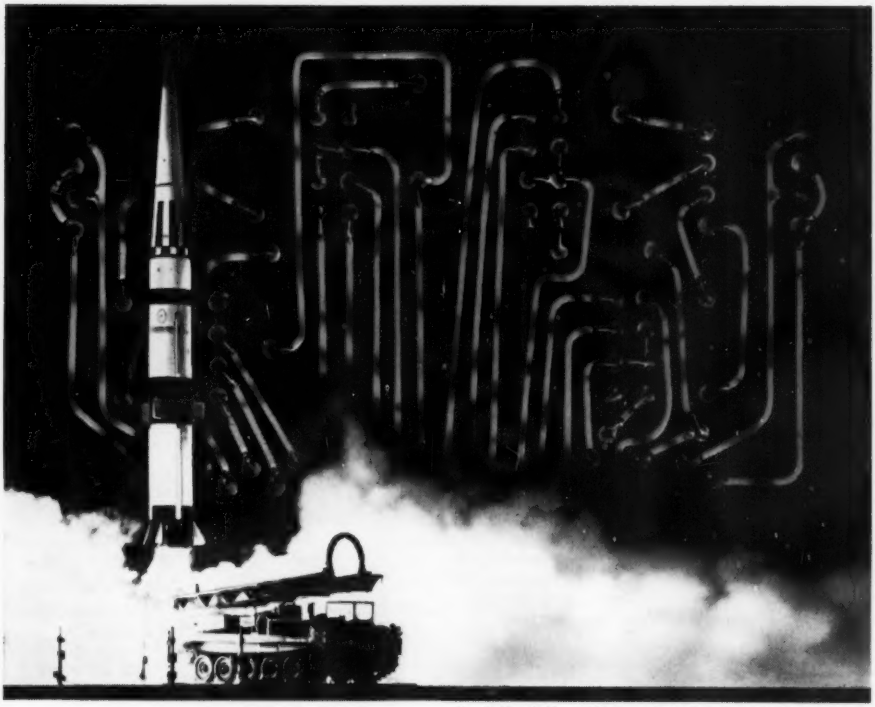
Rich, S. R., "Transducer Offers Improved Design," *Electronics*, (July 31, 1959).

Rich, S. R., "Improvements in Electroplating Due to Ultrasonics," *Plating*, (November, 1959).

"Evaluating the Effectiveness of Ultrasonic Cleaning," prepared by the Engineering Standards Committee, Ultrasonic Manufacturers Association, *Ultrasonic News*, (First Quarter, 1959).

★ ★ ★

Additional copies *of this article are available as long as the supply lasts. Write PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio.*



The highly reliable new Pershing Missile built by the Martin Company

At Dev Tek, Inc.

RIGID PERSHING MISSILE SPECS ARE MET WITH AUTRONEX ACID GOLD PLATING PROCESS*

Dev Tek, Inc., Orlando, Florida, uses the patented Autronex Acid Gold Process to plate circuit conductors. According to Mr. A. F. Goldsby, Dev Tek President, Autronex Acid Gold permits compliance with the rigid ABMA-428 specifications for a hard bright coat of gold alloy 100-150 millionths thick covering all circuit conductors.

Dev Tek is one of the very few manufacturers of electronic components qualified to meet the ABMA Huntsville Specification ABMA-428 and PDS-1C for printed circuits and encapsulated assemblies, as used in the highly reliable new Pershing Missile. The specifications require close control over processes and raw material so that reliability is assured for each part that goes into the missile.

Dev Tek controls the gold bath closely which gives an easy-to-solder-to surface which readily yields the desired ABMA PDS-1C solder joint characteristics of the exacting Pershing workmanship standard.

SEL-REX makes the world's largest selection of processes and systems which take the guesswork out of plating with precious metals. Baths are simply maintained with scientific precision by additions of pre-measured salts or solutions. Your assurance of consistent quality results from one batch to the next.

An internationally based network of sales and service technicians is at your beck and call to make sure you get the optimum results built into every SEL-REX PROCESS.

Complete technical literature free on request. Specify precious metal(s) and your application.

Patented processes for plating with Gold, Rhodium, Platinum, Paladium, Silver, and to produce "custom alloys" for your particular requirements.

*Patented

SEL-REX CORPORATION

NUTLEY 10, NEW JERSEY

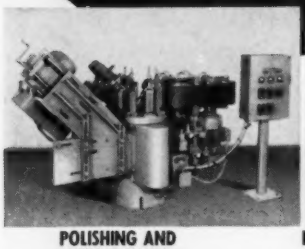
The World's Largest Selling Precious Metal Plating Processes

For more data circle 342 on Postpaid Card

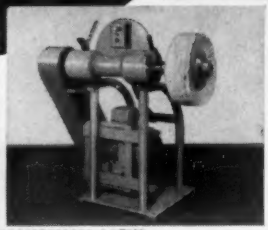
MURRAY-WAY SPECIALIZED FINISHING EQUIPMENT

JUNIOR FLAT POLISHER— versatile production unit for economically grinding, polishing, or deburring flat surfaces.

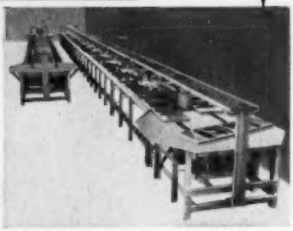
HORIZONTAL-PLATEN CONVEYOR built to fit your exact requirements.

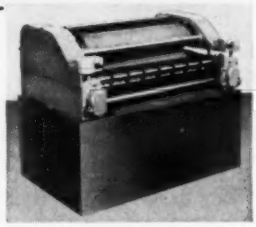


POLISHING AND BUFFING TABLE— small dial table has abrasive belt head and buffing head for spiral aluminum shapes



ECONOMICAL LATHE— stripped of many unnecessary "frills" to keep costs to a minimum.

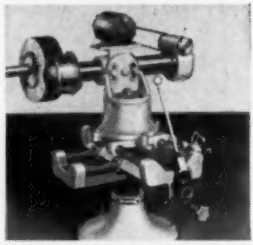




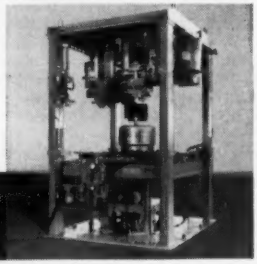
ROLLER COATER— a trouble-free, precision unit that coats one or both sides of a sheet.

...IMPROVES QUALITY, REDUCES COSTS FOR METAL PRODUCTS MANUFACTURERS

Polishing, buffing, grinding, filtering, deburring, materials handling . . . whatever your problem, Murray-Way equipment will do the job better and more economically. Fresh ideas based on a solid background of experience, enable Murray-Way's fine engineering and production departments to handle any and all of your production problems— large or small. The BETTER WAY is the MURRAY-WAY.



HAN-D-MATIC— low cost machine with interchangeable components for buffing, grinding, and deburring.



WIRE BRUSH MACHINE— deburrs automatic washer and dryer basket holes prior to painting.

MURRAY WAY

MURRAY-WAY CORPORATION
P.O. BOX 180 • MAPLE RD. EAST
BIRMINGHAM, MICH.

For more data circle 343 on Postpaid Card

KOCH Designs *Another Complete* FINISHING SYSTEM

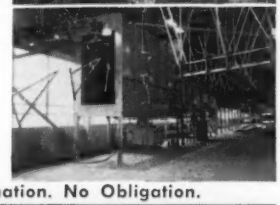
5 STEPS FINISH BOAT TRAILERS

Before modernizing the finishing system, these nationally advertised boat trailers were manually sprayed. This involved considerable manpower waste estimated at approximately 50% of finishing materials. Also, a 2500 gal. dip tank was used with the resultant fire protection problem and as well as being subjected to the usual contamination difficulties.

George Koch Sons' engineers designed this 5 step finishing system which coats all component parts of the trailers on a single conveyor line: 1. Wash and Phosphate, 2. Dryoff, 3. Flow coat, 4. Flow Out, 5. Bake.

The Koch multi-color low pressure flow coater in this line offers excellent coating coverage and a quick change-over for various colors. The Vapor Chamber which houses the Flow Coater and Flow Out conveyor, with controlled solvent saturation permits the finish to flow evenly without the usual sags and tears before drying or curing takes place.

George Koch Sons' engineers design all types of finishing systems for large automotive lines as well as lines for smaller products.



Illustrations Show 3 Steps of the Operation
1. Parts leave washing machine and enter bake oven.
2. Trailer parts being painted by oscillator flow coater.
3. Immediately leaving the Vapro Chamber, parts enter the bake oven for 40 minutes and are finished.

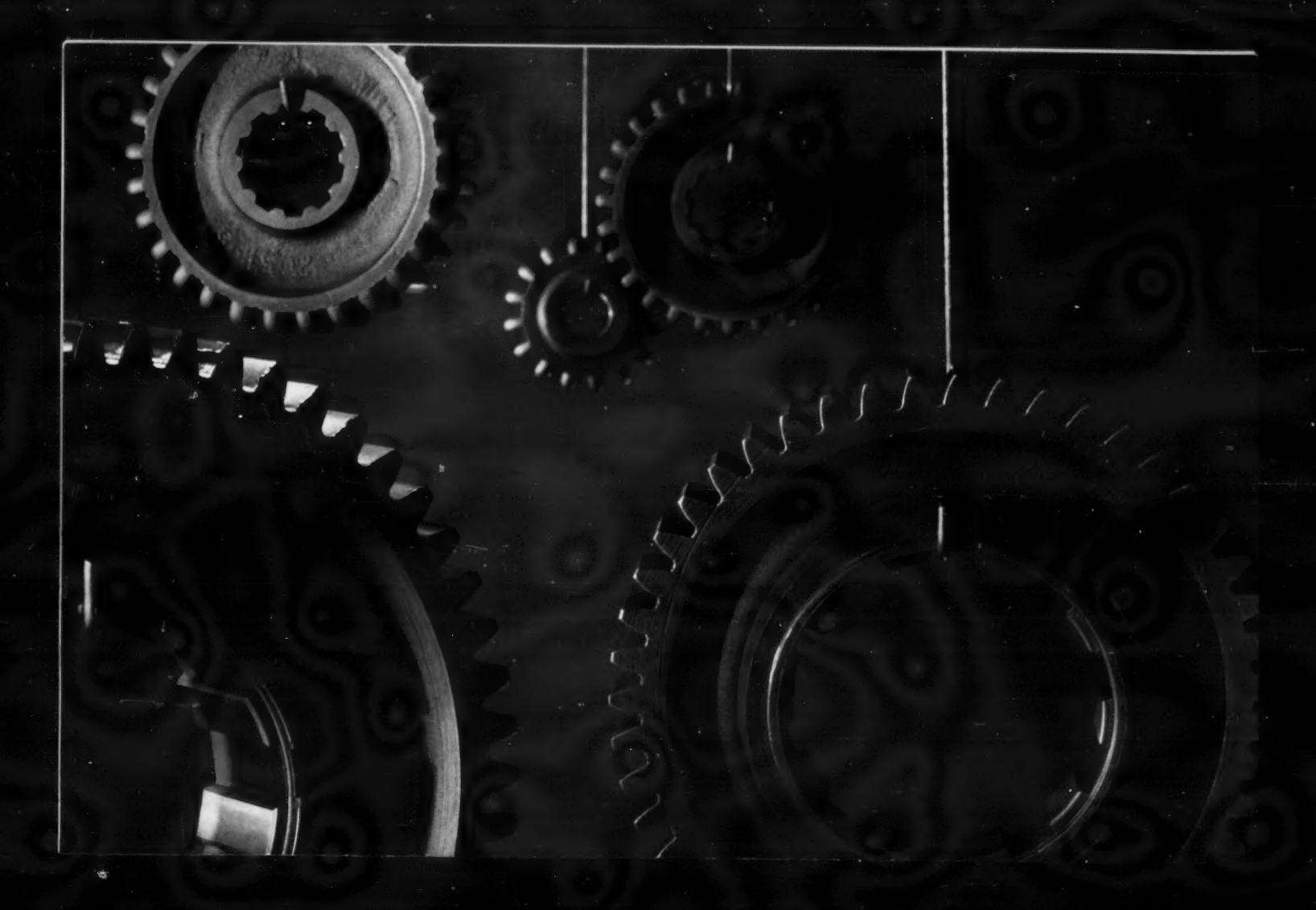
Manufacturer's Name Supplied upon request

Phone, wire, or write for further information. No Obligation.

GEORGE KOCH SONS, INC.
Evansville 4, Indiana

FINISHING SYSTEMS FOR WOOD AND METAL PRODUCTS • FLOW COAT SYSTEMS • DRYING OVENS • BAKING OVENS • SPRAY BOOTHS • REFUSE BURNERS

For more data circle 344 on Postpaid Card



NEUTRAL... BUT NOT TO GREASE!

NEU-TRI® solvent, Dow's super-stable *neutral* trichloroethylene for vapor degreasing, maintains its safety and effectiveness over long periods. Under heavy work loads or adverse operating conditions, a built-in, neutral-stabilizing system keeps NEU-TRI free of acids and other corrosive chemicals for an extended time.

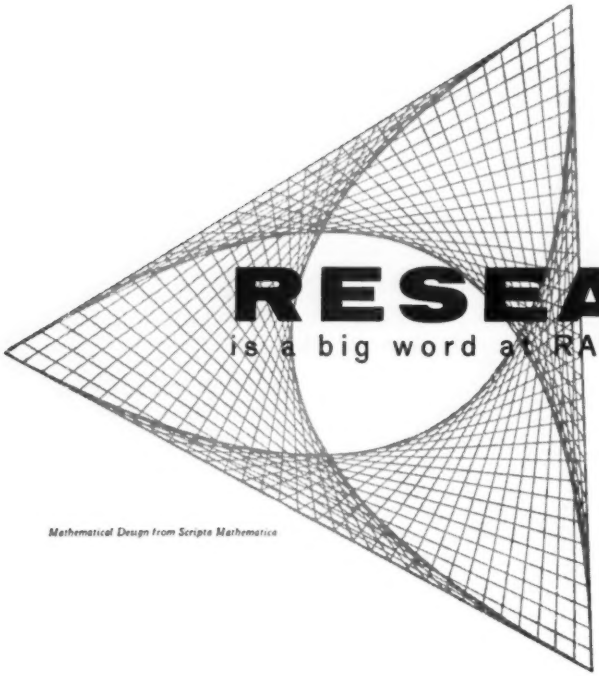
Add the other advantages . . . *no* flash point, low degreaser operating costs because of low boiling point, and high solvent power on oil, grease, and tars . . . and you will see why NEU-TRI solvent is best for efficient, low-cost degreasing.

Ask your distributor of Dow solvents. He has complete information about NEU-TRI and other Dow solvents for every application: Chlorothene®NU, trichloroethylene, perchloroethylene, and methylene chloride. He will be happy to explain uses, recovery, and costs. Or call your nearest Dow sales office.

SEE YOUR DISTRIBUTOR OF DOW SOLVENTS FIRST!

THE DOW CHEMICAL COMPANY DOW Midland, Michigan

PLATING POWER BY DC POWER SPECIALISTS



RESEARCH

is a big word at RAPID ELECTRIC

Mathematical Design from Scripta Mathematica

Our new Brookfield plant exemplifies our continuing research and development program. Here, complete laboratory and test facilities help initiate new designs, and controls for greater rectifier economy and efficiency. Those savings are passed directly on to you—the user.

No matter if your power requirements are large or small, typical or different, required *yesterday* or in the near future, you can rely on RAPID because at RAPID power supplies are our SPECIALTY.

From the smallest bench model to the largest of the automatics, RAPID offers speed in delivery and the utmost in value.

All *our* resources are *yours*. From our engineering department to our complete test facilities and immense stock pile of components, our operating methods are passed on to you in PRICE, QUALITY and SERVICE.

Call your local RAPID distributor today (name available upon request).

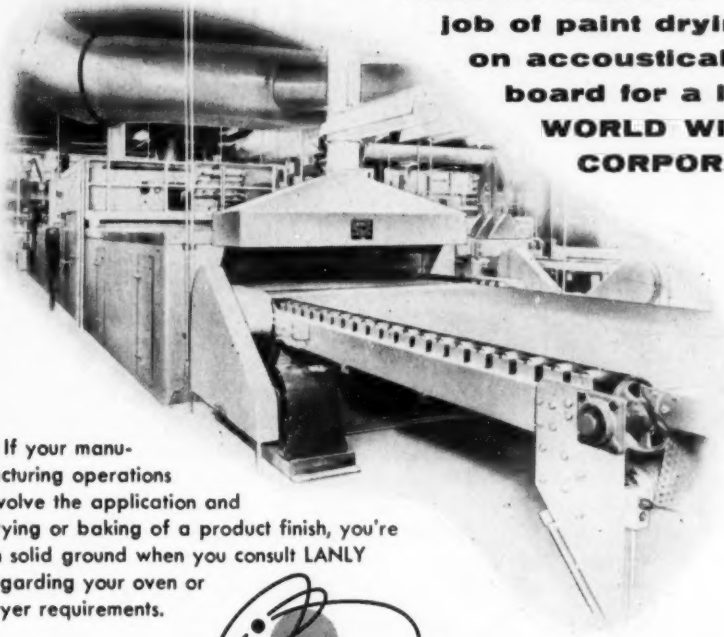
RAPID ELECTRIC CO., INC.

2881 MIDDLETOWN ROAD • NEW YORK 61, N.Y. • TAlmadge 8-2200
PLANTS: (4) NEW YORK, N.Y. • GRAYSBRIDGE ROAD, BROOKFIELD, CONN.

For more data circle 346 on Postpaid Card

This lanly Conveyorized Lay-Down-Dryer

does an efficient job of paint drying on accoustical board for a large WORLD WIDE CORPORATION



If your manufacturing operations involve the application and drying or baking of a product finish, you're on solid ground when you consult LANLY regarding your oven or dryer requirements.

THE lanly CO.
FINISHING OVENS
2802 Euclid Avenue • Cleveland 15, Ohio

LANLY welcomes a discussion of your drying and baking operation problems. Write for Catalog No. 560 and get better acquainted with our organization.

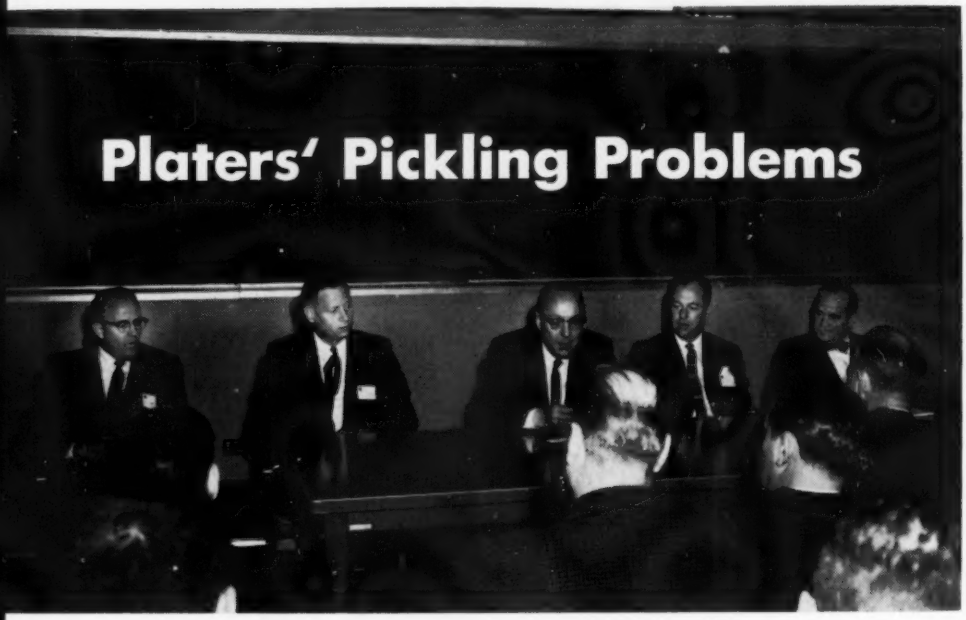
Find Your Representative In The Yellow Pages

Atlanta, Georgia • Birmingham, Ala. • Boston, Mass. • Chicago, Ill. • Cleveland, Ohio
Toronto, Ontario • Columbus, Ohio • Detroit, Mich. • Buffalo, N. Y.
Pittsburgh, Pa. • Rochester, N. Y. • San Francisco, Calif. • St. Louis, Mo.

For more data circle 347 on Postpaid Card

EXCLUSIVE PF FEATURE

Platers' Pickling Problems



How can we remove soils baked on during heat treating? Our pickled parts look oily. Why? We're having activation troubles prior to plating. What can we do to get deposition to begin?

. . . A panel discussion . . .

Reported by

GERARD H. POLL, JR.

Associate Editor

The questions and answers in this article are from the panel discussion on pickling that was part of the program of the Third Midwest Regional Conference of the American Electroplaters' Society, held recently at Argonne National Laboratories, Lemont, Illinois. Panel members are shown on the opposite page.

Chairman S. P. Gary opens discussion in Work Shop Session on "Pickling and Bright Dipping." Panel members shown (left to right) are: William P. Innes, MacDermid, Inc.; Kenneth Westerberg, Mechanical Plating Co.; S. P. Gary, Scientific Control Laboratories, Inc.; John F. Jumer, Alchemize Corp.; Jack Eley, E. I. du Pont de Nemours & Co., Inc. (PRODUCTS FINISHING Staff Photograph.)

We are plating Allen Head set screws which have been heat treated for hardening. How can we remove the carbon-oil film that's baked on during heat treating?

First ask the heat treater to be more careful about what's on the parts being heat treated. These baked-on soils are most difficult to remove.

Then there are basic procedures that should be followed anytime you have difficulty in pickling. These are just general recommendations. You can raise the temperature of the pickling bath, add wetting agent, increase concentration.

Anodic pickling sometimes removes insoluble soils. Naturally this is possible only if dimensional tolerances aren't too critical. Usually removal of a ten thousandth or so isn't harmful.

Alkaline descaling is another method that can be helpful. By using periodic-reverse current—10 seconds anodic and 5 seconds cathodic — you remove heat-treat scale on the anodic cycle and rust on the cathodic cycle. Sometimes it's wise to combine alkaline descaling with pickling—three or four minutes alkaline descaling punctures the hard coating, then the pickling acid can get through and undercut the remainder of the scale.

Steel mills have a rather drastic treatment that is most successful in removing scale. They use a solution that contains one pound per gallon of caustic soda plus one to four oz./gal. of potassium permanganate. At 160-180 deg. F. this solution is quite active. The treatment is followed by immersion in a solution containing 5-6 per cent nitric acid and ½-1 per cent hydrofluoric acid. The tank for this solution must be carbon brick.

Another technique that's partially mechanical in nature is to preclean the parts with hardened soils, roll

(continued)

them in a slurry of sand, then pickle.

Allegheny Ludlum Steel Corporation uses a formulation that gives a mirror-like finish in removing mill scale. Its composition is as follows:

6 gal. sulfuric acid, 66 deg. Be
6 gal. 75 per cent phosphoric acid
6 gal. hydrochloric acid, 18 deg. Be
4 gal. nitric acid, 36 deg. Be
3 gal. 60 per cent hydrofluoric acid
75 gallons water
25 oz. inhibitor

The solution is heated to 180 deg. F. Immersion time is determined by experiment.

Parts coming out of our pickling bath look oily. What causes this?

When iron salts build up in the pickling bath, parts look oily as they emerge from the bath. Iron salts should never be allowed to accumulate to more than 5 per cent concentration in a pickling bath.

We are plating carbonitrided parts with zinc or brass. One batch of these parts received recently has been practically impossible to activate prior to plating. The parts look as clean as a new silver dollar, but they won't plate. We've had to copper strike before plating them with zinc or brass. What can we do to avoid this in the future? What causes the problem?

Sometimes removing the barrel from the plating solution after plating for a few minutes helps to correct a situation like this. Soak clean, electroclean, pickle and begin zinc plating in the normal manner, then remove the barrel from the plating tank and allow it to be exposed to the air for a while; then begin plating again and deposition begins—the surface is active.

Sometimes a cyanide soak helps to activate parts that are difficult to plate.

Another technique that has sometimes given good results when activation is a problem is to allow the parts to soak in the plating bath at low current, without rotation. Then plate in the normal manner.

If the part is such that racking is practical, a zinc strike in a still tank immediately followed by normal barrel plating may do the trick.

Merely raising the voltage may improve activation if the surface is not too passive.

Would pickling be a good general subject for an A.E.S. Research Project?

You bet it would. This is an area where there are a lot of things we don't know. Such a project could uncover information that would be of practical value to every plater.

Are there any other suggestions for pickling parts with hard, chemical-resistant films which must be removed before plating?

Sodium hydride descaling will remove almost anything. It's a molten-salt process that operates at 1000

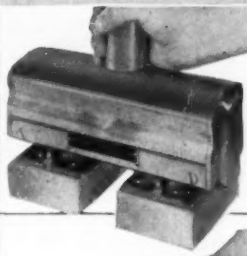
(continued)

Portable air and electric

Sanders

for production and maintenance work

Model OS-800
— lighest weight orbital air sander on the market, at only 3 lb., packs the power and speed needed for production jobs.

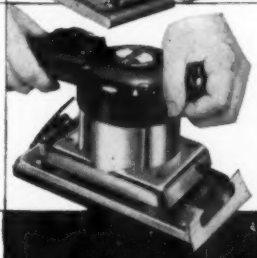


Model 600
— heavy-duty, straight-line air sander for sanding, pumice rubbing, or polishing, 1100 oscillations per minute.

Model OS-700
— single-pad orbital air sander, weighing 5 lb., operates over 6000 cycles per minute.

Model 4000
— straight-line, two-pad air sander with longer, slower stroke, 2100 oscillations per minute, 9 lbs.

Model 1000
— straight-line air sander with big abrasive area, operates at 2500 oscillations per minute, palm lever control, 7½ lb.



Model OE-900
— electric — heavy duty, high torque, constant speed. Not damaged by overload. No belts, gears or brushes.

Model SP-101
— straight-line, single-pad air sander, 3000 oscillations per minute, 5 lbs.

ASK FOR BULLETINS...
Specify models in which you are interested.

All air sanders suitable for wet or dry sanding; electric sander for dry work only.

SUNDSTRAND

SUNDSTRAND SANDERS

SUNDSTRAND MACHINE TOOL • Belvidere, Illinois

Division of SUNDSTRAND CORPORATION

For more data circle 348 on Postpaid Card

deg. F., followed by a water quench. It's expensive of course, and on some parts metallurgical properties may be changed by the high temperature and quenching.

We received a load of 5/16-inch cut-steel washers with a satin finish. The washers looked as if they had been rolled in sand. They would not plate in the normal manner and we were forced to prepickle. What might cause this?

Possibly these washers were treated in one of the various rust preventives. Some of these products are not visible on the part and yet are most difficult to remove. Try solvent degreasing to remove such rust preventives, some of which are not removed by alkaline cleaning.

Is it always advisable to use dry acid pickling salts or are there cases where conventional liquid acids will do the job just as well?

This is partially an economic problem, since the pickling salts are more expensive in direct comparison with straight sulfuric acid. But the salts have advantages that outweigh the economics in many cases. They are safer to use, easier to handle, are pre-formulated so that the user has no experimentation and development work to do. They contain fluoride additives that do an excellent job of removing silicates that may be left on a product after cleaning.

Some big users have replaced liquid acids with acid salts because they have found that the pre-formulated salts give more "bite" and reduce rejects. On the other hand, a "heavy-pickling" bath in a barrel line may get along well using the normal liquid acids if no unusual soils have to be removed and no problems are being encountered. Some platers add the dry acid salt to the liquid pickling bath as a means of adding inhibitor and wetting agents, which are present in the dry acid salts.

What's the best way of cleaning 6062 aluminum alloy welded with high-silicon rods? Alkaline treatments do not seem to do the job.

A mixture of nitric and hydrofluoric acids is effective at room temperature.

Copper plated steel parts are sometimes cut through to the steel during buffing. Normally these parts would be nickel and chromium plated, but when the copper is buffed off to expose basis metal, a "halo" effect is visible even after nickel and chromium are applied. What kind of treatment corrects this condition?

There are several methods of attacking this problem. You can boost the secondary brightener in the bright nickel bath; use of hydrochloric acid instead of sulfuric acid in the pickling bath may help; cathodic pickling for 15 seconds at 120 deg. F. is sometimes recommended; cathodic cleaning often

(continued)

...and a better base for paint

Research and development in our laboratories lowers the cost and improves the effectiveness of rustproofing treatments on the products of our customers.

We show customers how to make metal surfaces resist corrosion longer, and hold paint better, with improved chemical formulations and refinements in processing controls.

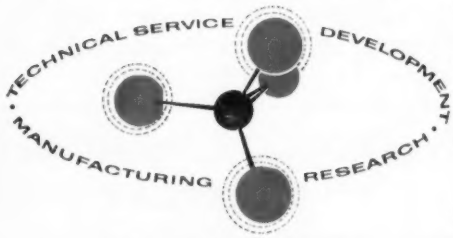
To do this, we have the largest research and development effort in the rustproofing field.

We examine metal surfaces magnified up to 350,000 times with electron microscopy . . . analyze metals and treatments by X-ray diffractometry . . . and develop the best rustproofing systems and chemicals for customers in our extensive pilot production phosphating facilities.

Many practical discoveries have come from our continuing research and development program.

A recent example: Using our improved chemicals for production rustproofing, customers produce micro-crystalline corrosion protection that makes a highly receptive paint base for acrylic and epoxy paint formulations as well as more conventional paints and enamels.

TECHNICAL FACILITIES AND SERVICES



- Consulting and engineering service for investigation of metal finishing problems.
- Supervision of new process installations and training of operating personnel.
- Regular Quality Control service by qualified field engineers.
- Immediate emergency field service.
- Fully staffed Customer Service Laboratory complete with pilot processing facilities to duplicate actual production.
- Prompt, dependable delivery of production chemicals.

INTERNATIONAL RUSTPROOF COMPANY

(A Division of the Lubrizol Corporation)

1061 East 260th Street • Cleveland 32, Ohio

For more data circle 349 on Postpaid Card

corrects the condition; citric acid pickling has been used.

In pickling zinc die castings, other than the common solutions such as 2 per cent sulfuric acid, what products can be used advantageously?

Fluoboric acid can be used. It has the additional advantage of removing silicates.

Fluoboric acid also permits longer immersion times, with a brightening effect. Phosphoric acid seems to be easier to control than the other acids. But tons of die castings are pickled in sulfuric and then painted and baked to demonstrate that the paint adheres well.

The Germans electroclean all die castings cathodically in alkaline solutions prior to pickling and plating.

One thing that can be very troublesome in plating die castings is percentage of impurities in the zinc. If tin or cadmium are present in quantities greater than 0.005 per cent, nobody can plate the die casting.

★ ★ ★

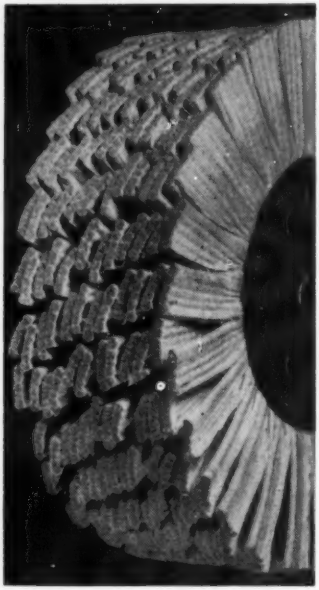
Additional free copies *of this report are available as long as the supply lasts. Write PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio.*

PRODUCTS FINISHING DIRECTORY
Your buyers' GUIDE

IF YOU WANT

FAST RUGGED ACTION

on your heavy-duty operations, you will . . .



specify the CHURCHILL 544-RD Cord Sisal Finger-Buff*

Improved construction of the sisal 544-RD Churchill Finger-Buff* provides new, effective cutting action, particularly adapted to perform the heaviest of buffing operations.

Made from the same high quality, super-twisted sisal twine as other Churchill sisal wheels, each finger has added strength and rigidity for severe usage. Thus the life and cutting power of this extra heavy-duty Churchill 544-RD Finger-Buff* is greatly increased. Write for particulars.

*T.M. Reg. U.S. Pat. Off.

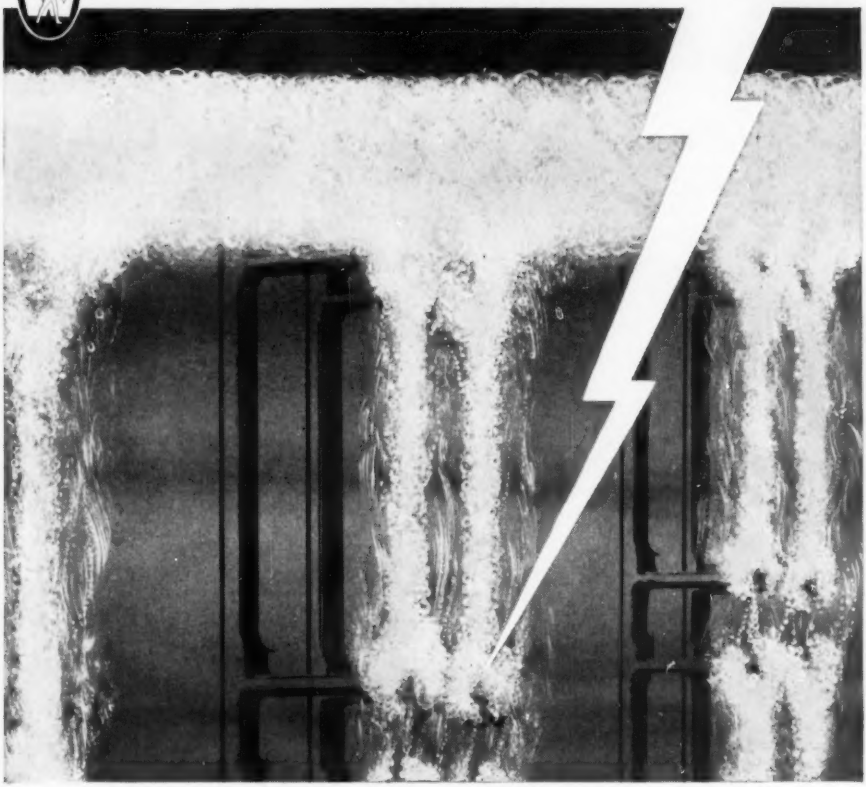
REPRESENTATIVES IN PRINCIPAL CITIES

Geo. R. Churchill Co., Inc.

DEPT. PF-121, HINGHAM, MASS.

For more data circle 350 on Postpaid Card

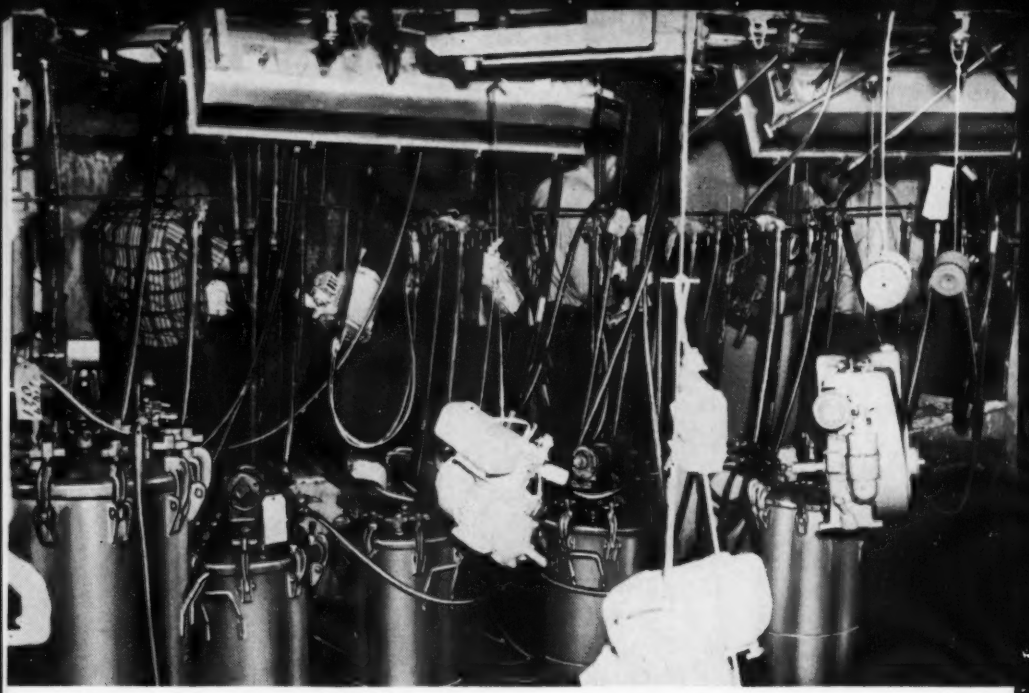
CREATIVE RESEARCH • QUALITY PRODUCTS • PROFESSIONAL SERVICE



MAXAMP

Need a high-conductivity steel electrocleaner that instantly removes smut and buffing compounds? Wyandotte's MAXAMP® is your answer. Platers from coast to coast have switched to MAXAMP, because it quickly and thoroughly removes stubborn smut, drawing and polishing compounds, fabricating oils and phosphate coatings – even under difficult conditions. MAXAMP solutions remain effective over long periods – even under heavy soil loading. Call your Wyandotte representative to arrange for a production trial.

Wyandotte Chemicals
J. B. FORD DIVISION
WYANDOTTE, MICHIGAN • LOS NIETOS, CALIFORNIA • ATLANTA, GEORGIA
For more data circle 351 on Postpaid Card



Painting 10,000 Small Gasoline Engines Daily

Complete automation is impractical in painting anything as complex as light industrial and commercial gasoline engines. But the finishing department of Clinton Engine Company's Maquoketa, Iowa, plant has everything but automation to keep up with fast-moving production lines.

A conveyor takes the assembled engines through the complete cycle—cleaning, painting and baking.

First step is a trip through a three-stage washer which cleans and phosphatizes the engines.

On their way from the washer to the spray booths, the engines drip dry and cool.

Paint is sprayed in three 12-foot-wide Binks Dynaprecipitor water-wash spray booths. Both primer and finish coat are applied in one pass. Normally only two of the booths are used, with the third one in reserve for peak-production periods. Three men work in each booth.

A finishing department equipped for fast spray painting in 125 different colors . . .

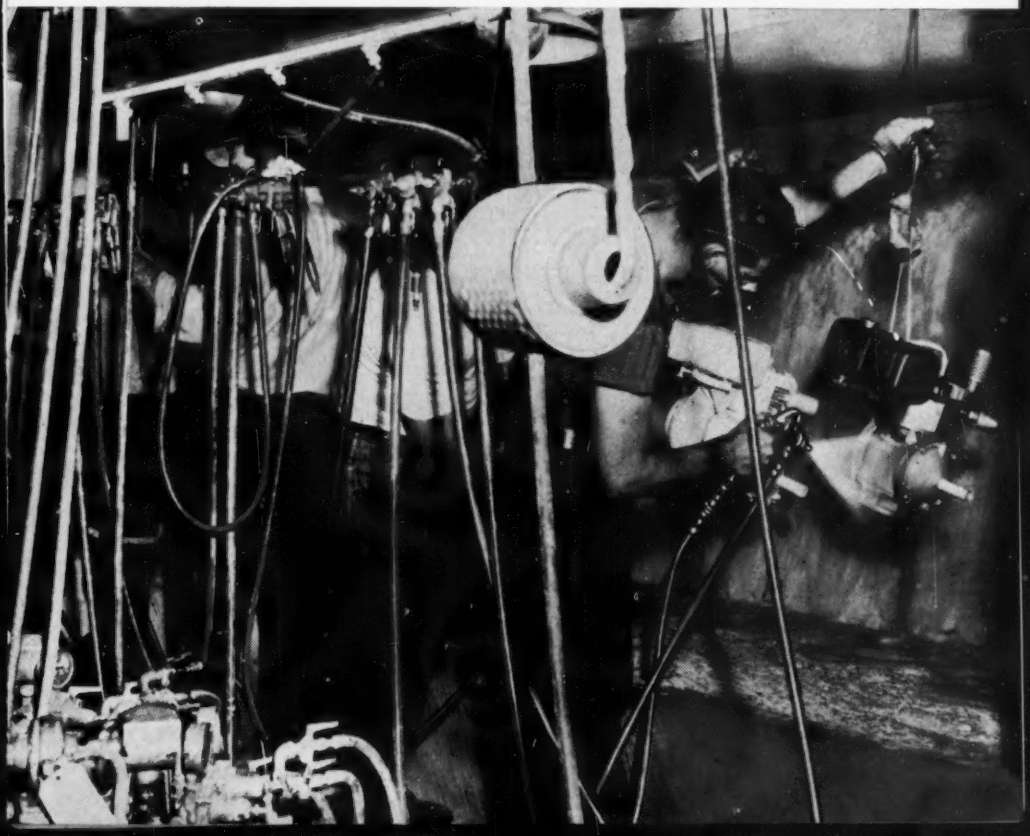
Fig. 1—Two of the spray booths used in painting Clinton engines. Spray guns behind painters are connected to pressure tanks containing various colors of paint, facilitating color change.

Fig. 2—Engines are painted after they have been completely assembled.

Change from one color to another is rapid. Utilizing a rack of 15 to 20 Binks model 18 spray guns (which is standard equipment in each booth) the painters choose the colors they need. Each gun is connected to a pressure tank (10- and 30-gallon tanks are used) containing one of the colors on the day's production schedule. Thus changing color is just a matter of connecting an atomizing air line to a different spray gun.

Each engine is color coded as it

(continued)



comes through the booth to tell the painter which color is required. Thirty to thirty-five colors are applied in a typical day's run.

Hot spray speeds application and improves finish quality for Clinton. The finishing department is now converting to a paint heater recently introduced by Binks. This heater has a finned paint tract 27 feet long coiled about a Calrod electric heating element. Paint is heated to 150-160 deg. F. as it goes through this tract. Since all heat must travel through the tract (and the paint) before it can reach the outer shell, heat transfer is quite efficient. Therefore the heating element can operate at lower temperatures and "bake-out" is less likely to occur within the tract.

According to Darrell Hute, general foreman of the Assembly, Test and Packaging Department, "The new paint heaters have eliminated downtime for cleaning and maintenance. They require only flushing

(continued)

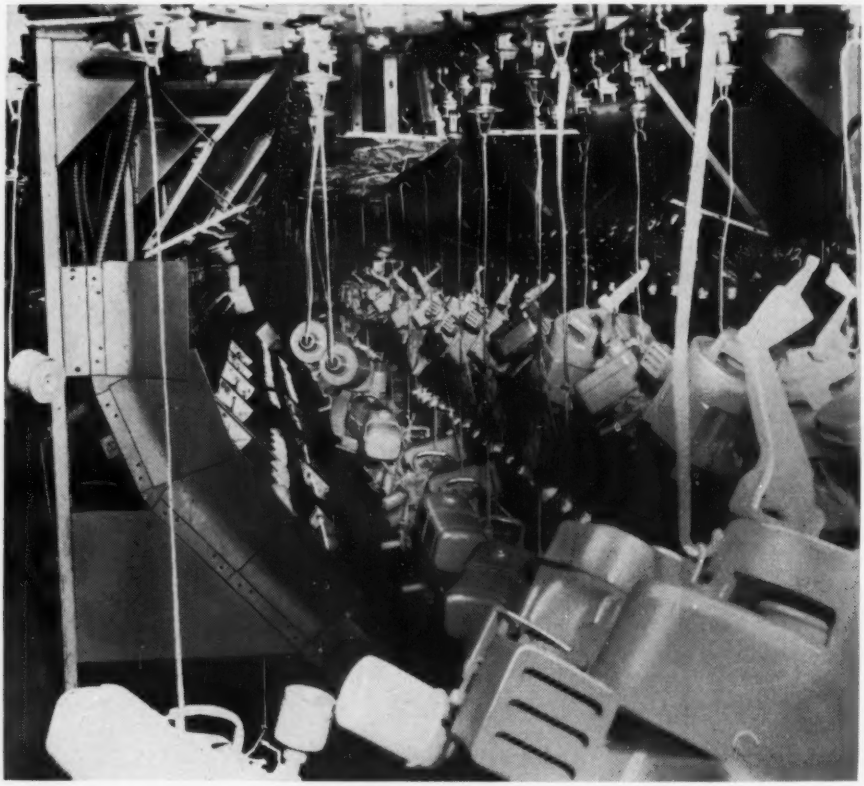
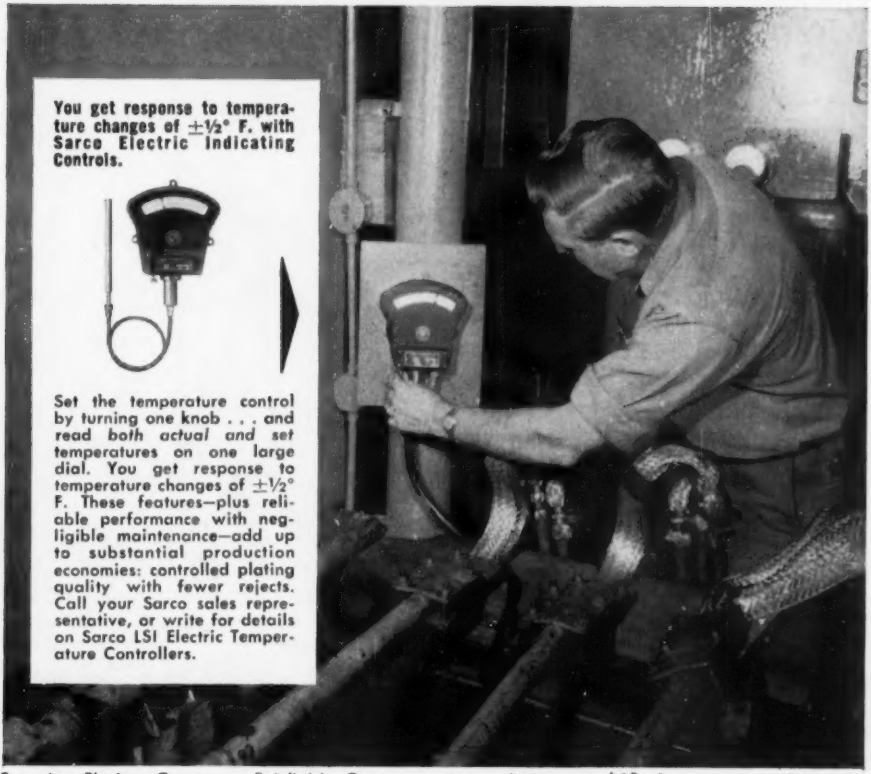


Fig. 3—Painted engines bake in two infrared ovens.


You get response to temperature changes of ±½° F. with Sarco Electric Indicating Controls.
Set the temperature control by turning one knob . . . and read *both actual and set* temperatures on one large dial. You get response to temperature changes of ±½° F. These features—plus reliable performance with negligible maintenance—add up to substantial production economies: controlled plating quality with fewer rejects. Call your Sarco sales representative, or write for details on Sarco LSI Electric Temperature Controllers.

Superior Plating Company, Fairfield, Connecticut, holds the temperature of its chrome plating solution to ±2° F., automatically, with Sarco electric indicating temperature controls

How Superior Plating Company controls critical temperatures in Chrome-Plating Tanks with Sarco Electric Indicating Regulators

In its modern plant at Fairfield, Conn., the Superior Plating Company produces its famous TIBON hard chrome plated ways for machine tools and other TIBON precision plated parts. Working to tolerances less than .0005", to produce the most accurate plating in the industry, solution temperatures are absolutely critical. That's why Superior controls the temperature of the plating solution to ±2° F. over a range of 90° F.–140° F. with Sarco electric indicating controls. Vinyl-coated bulbs are used for longer life. Sarco electric indicating regulators have been controlling Superior plating temperatures for over two years—with complete dependability. 9776F

SARCO
COMPANY, INC.

635 Madison Ave., New York 22, N. Y.

For more data circle 352 on Postpaid Card

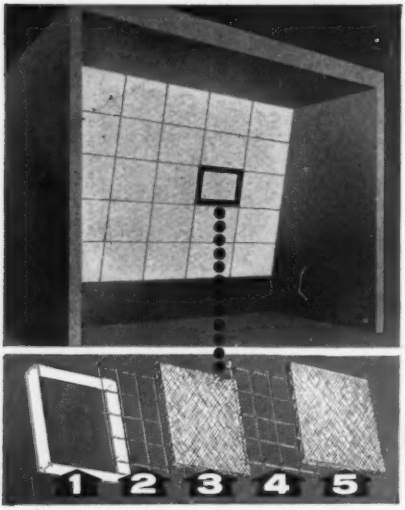
with solvent, which can be done without disassembly."

The painted engines bake in two 35-foot-long Fostoria infrared ovens, each of which has three conveyor tracks passing through. Parts travel through one oven, make a "U" turn, then go through the second oven. Both ovens operate at 240 deg. F. and parts take 9-12 minutes to go through, depending upon conveyor speed.

Leaving the second oven, the engines are air blasted to cool them for packaging.

Total time required for final assembly, cleaning, painting, baking, inspection and packaging is 45 minutes. This includes a six-minute test run for each engine.

Fig. 4—Cutaway view: Binks paint heater. (Photos courtesy Binks Mfg. Co., Chicago.)



A Paint Arrestor module consists of a Holding Frame (1), two Snap-in Grids (2 and 4), two Paint Arrestors (3 and 5). Loaded Paint Arrestors are simply replaced as necessary. And, they're also ideal for air-borne ink, mist, dye, frit, etc.

CONTROL PAINT OVERSPRAY the inexpensive, effective way!

The advantages of R P Paint Arrestors, the inexpensive, disposable air filters are many. Overspray solids are trapped before they reach the exhaust stack...to reduce fire hazards, damage to adjacent property...disagreeable and time-consuming maintenance work. Installation? —easy and fast. Maintenance? —remove loaded Paint Arrestor and replace a new one. Adaptability? —ideal for any type, any size booth, new or existing.

RP® PAINT ARRESTORS

RP Products of Research — UL Listed

RESEARCH PRODUCTS Corporation

Dept. 36-L, MADISON 1, WISCONSIN

For more data circle 353 on Postpaid Card

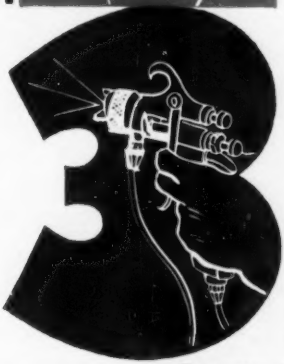
CLEAN SPRAY-BOOTH DOWN TO BARE METAL ... then

SPRAY ON A 2-MIL COAT OF LIQUID ENVELOPE SPRAY-BOOTH COATING ... when overspray builds up ...

Now you can

"Automate" SPRAY-BOOTH CLEANING

PEEL BOOTH CLEAN in big, big pieces. Takes only a few minutes.



RE-COAT WITH A 2-MIL COAT OF LIQUID ENVELOPE SPRAY-BOOTH COATING

New Users:

Order a 5-gallon **Test Sample** at the drum-lot price from our nearest distributor.

For more data circle 354 on Postpaid Card

BETTER FINISHES & COATINGS, INC.

268 Doremus Avenue, Newark 5, N. J. • 2030 East 15th St., Los Angeles 21, Calif.

SPRAY BOOTH DISTRIBUTORS

Allentown, Pa., E. I. Frey
Baltimore, Air Engineering Corp.
Baltimore, Budeke's, Inc.
Bridgeport, Conn., Motor Equip. of Bridgeport, Inc.
Brooklyn, N.Y., Su Per Corporation
Brooklyn, N.Y., Eastern Distributing Co.
Buffalo, Buffalo Equipment & Chemical Co.
Buffalo, Ellicott Paint Co., Inc.
Canton, O., Bison Corporation
Charlotte, N.C., Livingstone Coatings, Inc.
Chicago, Paints & Lacquers, Inc.
Chicago, Hydranamic Engineering, Inc.
Cincinnati, Globe Chemical Co., Inc.
Claremont, Calif., Silco Coatings, Inc.
Cleveland, The Koehler Rubber & Supply Co.
Cleveland, R. W. Renton Co.
Columbus, O., The Dean and Barry Co.
Denver, M. L. Foss, Inc.
Detroit, Abrasive and Supply Co.
East Syracuse, N.Y., Protective Products Co.
Fort Wayne, Ind., National Mill Supply Co.
Grand Rapids, Nelson Industrial Supply Co.
Hanover, Penna., C. H. Reed Co.
Hawthorne, Calif., National Research & Chem.
Huntington Park, Calif., Clark's Paint & Lacquer
Indianapolis, Central Rubber & Supply Co., Inc.
Lansing, Mich., Painters Supplies, Inc.
Large, Pa., Carmac Chemical Co.
Long Island City, N.Y., Haupt Indus. Supply
Los Angeles, Hubbard Co.
Los Angeles, Spray Equipment Co.
Los Angeles, Sprayway Co.
Los Angeles, Thompson Lacquer
Los Angeles, Bradley Paint Co.
Milwaukee, O'Donohue Industries
Minneapolis, John Henry Foster Co.
Needham, Mass., General Spray Equipment Co.
Newark, N.J., Union Chemical Co.
Newark, N.J., Gray Co.
Newton Highlands, Mass., Harlow-Imrie Corp.
New York, Mutual Electric & Machine Corp.
Norristown, Pa., Colonial Auto Supply Co.
Omaha, Tri State Spray Equipment Co.
Paterson, N.J., Abeles Lewit Co., Inc.
Philadelphia, Air Flow Co., Inc.
Philadelphia, Hovey Spray Equipment Co.
Philadelphia, George V. Morris
Portland, Me., The Emery-Waterhouse Co.
Providence, Franklin Supply Co.
Raleigh, N.C., Raico Sales Co.
Reading, Pa., Avril, Inc.
Rockford, Ill., Mid States Industrial Corp.
Rochester, N.Y., H & W Chemicals, Inc.
St. Louis, The Leonard Company
San Francisco, R. M. Bracamonte & Co.
San Francisco, Pauli & Griffin Co.
Seattle, Marine & Industrial Supply Inc.
Springfield, Mass., Bay State Spray Equipment Co.
Toledo, Vic Miner Co.
Trenton, N.J., Charles Schick & Co.
Washington, D.C., C. I. Smith Co., Inc.
Waterbury, Conn., Lea Manufacturing Co.
Wilmington, Del., Bruce Indus. Supply & Equip. Co.
Wilmington, Del., Mammele's, Inc.
Wilmington, Del., B. Frank Shinn

FOREIGN DISTRIBUTORS

London, England, Janson & Nicholson Ltd.
Willoughby, S. W. Aust., G. Herring (Aust) Pty. Ltd.

2 OPERATIONS SAVED.
On base of small waffle iron, 1 cut-down operation, and 1 hand coloring operation have been eliminated through the use of Superlume.

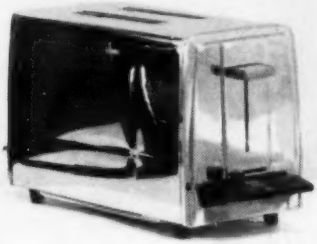
1 OPERATION SAVED.
On base of large waffle iron, 1 coloring operation is no longer necessary

3 OPERATIONS SAVED.
On round toaster shell, 1 cut-down operation and 2 coloring operations have been eliminated.

1 OPERATION SAVED.
On the steam iron shoe, 1 hand coloring operation has been eliminated.

yet SUPERLUME vastly improves all 5 of these Son Chief products ...and at no extra cost.

says NICHOLAS J. LAZZARO, JR.
Asst. Plant Superintendent
in Charge of Finishing,
Son Chief Electrics, Inc.,
Winstead, Connecticut



HIGHER QUALITY FINISH.
On square toaster shell, same finishing operations are required with Superlume, but appearance of product is tremendously improved. On all 5 products, in fact, Superlume has stepped up product quality appreciably—and, in every instance, *at no increase in cost.*

Son Chief Electrics, Inc., appliance makers, sought a thicker, brighter plate, more rapidly applied. They found it in Superlume—along with major reductions in finishing operations, plus what Nick Lazzaro calls "Tremendous improvement in our products' appearance ... a real breakthrough in quality."

Actually, Son Chief is plating *twice* as thick in the same time as before (using 60 amps per sq. ft. instead of 30).

They're plating flat pieces now and forming *after* plating ... a big production advantage unique with highly ductile Superlume.

Superlume bath is easier to maintain. Son Chief's normal operating schedule is 5 days, 16 hours a day. But for two months every year, they work on a *24-hour/5-day basis.* Average pieces per hour through trouble-free Superlume: 336, with a low of 226, a high of 904. Son Chief plates 30 different parts ranging from 1 to 20 inches long. Superlume bath in use: 3100 gallons.

Good-sized operation ... healthy benefits ... no added production costs. For full facts on Superlume as applied to *your* operation, contact H-VW-M. Chances are you, too, will be better off with this better bright nickel bath.

H-VW-M
Progress in metalfinishing through advanced processes • equipment

Hanson-Van Winkle-Munning Company, Matawan, New Jersey
Offices in Principal Cities
Alert Supply Company is H-VW-M in the West • Los Angeles • San Francisco

For more data circle 355 on Postpaid Card

EXCLUSIVE PF FEATURE

What can we do to prevent "arcing" in barrel plating large parts at 15-18 volts? What's the easiest way to barrel nickel plate 400 series stainless? What about barrel chromium plating?

. . . A panel discussion . . .

Reported by
GERARD H. POLL, JR.
Associate Editor

Panel Member Joseph Corre, Amphenol-Borg Electronics Corp. answers a question from the floor in the Work Shop Session on "Barrel Plating." Other panel members (left to right) are: Dr. Russel E. Harr, Western Electric Co.; E. H. McCoy, Electrochemical Products, Inc., moderator of the session; Herman A. Tessmann, Allen-Bradley Co.; William C. Geissman, National Lock Co. (PRODUCTS FINISHING Staff Photograph.)

The questions and answers in this article are from the panel discussion on barrel plating that was part of the Third Midwest Regional Conference of the American Electroplaters' Society, held recently at Argonne National Laboratories, Lemont, Illinois. Panel members are shown on the opposite page.

What are the advantages and disadvantages of button-type contacts and cable-type danglers?

The kind of part you're plating determines which type should be used. In plating fragile parts, you may have to use buttons. The disadvantage is their high maintenance cost. In recent years, we've gotten away from this type of barrel by using conductive discs in the ends of the barrels. They have worked well for us on fragile parts. If you can use them, however, the danglers are better, since they put current in the center of the load.

Another application in which danglers are often avoided is the barrel plating of aluminum and magnesium. You have to be careful to avoid damaging the parts. They are soft and you can cut through the zincate film easily. This might be an application for either the button-type contact or the disc-end barrel.

How do you keep small, flat parts from sticking together? About 50 per cent of certain parts we plate come out looking good and the rest are plated on one side only.

Some people put in a heavy chain along with a load of flat parts. It would have to be heavy enough to actually hit the parts and break them apart. Increasing speed of rotation sometimes helps.

Addition of wetting agent might increase slippage between the parts. The "tumbling" or oscillating-type barrel also helps keep parts away from one another.

A non-metallic short bar put in diagonally across one panel as in a cement mixer agitates the parts and

(continued)

"An extra-heavy 'tumbling rib' on the door panel really breaks up the load."

keeps them away from one another.

An extra-heavy "tumbling rib" on the door panel really breaks up the load. This door with its tumbling rib (possibly 3 inches high) should be used in plating parts that stick together. The rib could be mounted on an extra door.

Zinc plating and chromating parts is even more troublesome (with respect to sticking) than nickel plating parts that stick together. When you've got flat parts and you have to chromate them in a basket, you have to chromate just a few of them at a time. I wish we knew how to chromate parts that stick together in a basket.

Total immersion of the cylinder sometimes helps in plating parts that tend to stick. Contact fingers or nails through the side of the barrel or the door also may be helpful.

As we approach the size of the parts which perhaps ought to be still plated, we encounter arcing when barrel plating at 15-18 volts. This mars the finish. What can be done about this? The barrel is submerged and still arcing occurs. I'm talking in this particular instance about an automatic barrel machine.

This is a problem that is not foreign to our plant. We try to plate as fast as we can. But there are certain parts that just can't be plated quickly because we have to cut the voltage to avoid arcing. We're now evaluating a button-type barrel to see whether it might solve the problem. Since the least amount of current that a dangler can carry is one-

"Some people put in a heavy chain along with a load of flat parts."

"Contact fingers or nails through the side of the barrel or the door also may be helpful."

half the current that's going through the barrel, and the dangler makes contact in only one or two spots, arcing occurs. In a button-type barrel only a fraction of the current is carried by each contact.

How much do you cut the voltage?

To five or six volts.

In zinc?

In zinc, cadmium or brass.

You mean an absolute overall of 6 volts in barrel zinc plating?

That's right. There is very little area in the barrel and you just have to cut the current to plate parts such as thin sheet metal items.

Could you mix in some other parts to better distribute the current?

You could. But sometimes you don't have parts ready to mix with such a load. Then you have to plate some metal and waste it on worthless parts.

Possibly putting a chain or some other conductor in the barrel with the parts would help to prevent arcing by making contact between the parts. We have used chains successfully in plating long screws and similar items. But in case of hardware, the chains get tangled with the parts and then you're in trouble again. They batter the parts, too.

When arcing occurs, what percentage of the parts are affected in plating at 12 volts?

It would depend on the part, but usually just about every part.

Do you get more arcing in an oblique barrel than in a horizontal barrel?

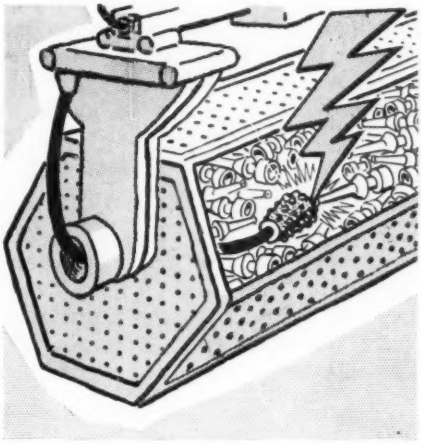
I think you'd get more in a horizontal barrel.

Are there other suggestions for minimizing arcing?

We've had enough trouble with arcing so that we've given it a lot of study and thought. One of the things that we found is that if a dangler end is pitted and worn by being plated and stripped and plated and stripped, the arcing is worse. A new dangler is less likely to cause arcing than an old one. This is still not a solution to the basic problem, however.

What would be a good cycle for barrel plating nickel on 400-Series

(continued)



". . . if a dangler end is pitted and worn by long use . . . the arcing is worse."

"We have plated 400-series stainless and found that the nickel strike is necessary."

stainless? Could you get by without the Woods nickel strike?

You might. But I wouldn't take a chance on it.

Could you use cyanide copper instead?

No. You can't use any of the conventional methods. We've tried them all. We haven't tried Woods nickel yet. But the regular methods of barrel plating are unsatisfactory.

We have plated 400-Series stainless and found that the nickel strike is necessary. Without it you don't get adhesion.

How about a muriatic acid strike?

Woods nickel is safer.

Several months ago, there was an article in PRODUCTS FINISHING about adding methyl cellulose to cyanide barrel plating baths to jell the solution so as not to damage fragile parts. Has anyone tried it?

No, but according to Harry West, author of the article, Westinghouse does this to prevent nicking of fragile parts and the procedure is successful. It has possibilities.

In New England, they bulk plate many types of fasteners—these are flat parts. They have trouble removing the parts from the barrels on automatic machines. They stick to the sides. How do you prevent this?

You could have a nozzle in your barrel that would spray automatically and flush out the parts. By coordinating the nozzle spray with the machine's cycle, it could be done automatically.

What techniques are useful in preventing electrochemical corrosion from destroying plating tanks when submerged anodes are used?

Usually this occurs most rapidly when sludge accumulates on the tank bottom. If you have a layer of sludge, the tank is acting as the anode and the steel corrodes rapidly. Regular cleanouts prevent this. The best solution, of course, is to have your tank lined.

You can have a submerged anode, and have it insulated from the tank, too. We buy all of our tanks lined, and then we put in a brick lining, but we still use a submerged anode, because that's the best way to do it. I think we will continue this procedure in the future because you can't take time to remove sludge every week. It costs too much.

Do you have the brick cemented only in the bottom of the tank?

Yes, just in the bottom.

I honestly don't think that making the tank anodic is important because the same thing happens in plating copper. Barrel copper seems to me to be the biggest offender. Even with a separate anode circuit, corrosive elements seem to drill right through the tank's bottom. A big part of this corrosion is caused by what you drag into the tank. If you drag in a lot of chloride, you're going to corrode the steel.

We have, on occasion, put an extra bottom in a tank by welding ¼-inch plate to the bottom. It does not cost much to weld in the extra piece and the tank will last maybe three or four times as long.

What about barrel chromium plating? There are German barrels, English barrels and domestic barrels. Which is best?

If anybody asks about the relative merits of chromium barrels, I think they're talking about the wrong thing. Many people have asked how we chromium plate in a barrel. There is only one reason we can do it: we're applying a nickel that makes possible barrel chrome. The most important factor in chromium plating in a barrel is the condition of the nickel. We now electrolytically purify our nickel solution continuously and filter it through carbon. This is the most important part of the whole process —to keep the nickel solution in good condition. I believe improved chromium solutions have also helped to make possible the plating of chromium in a barrel. You can plate in any barrel, if you have the right nickel solution and the right chromium solution. The barrel doesn't have to be fancy.

What items do you plate?

Screws and some other little parts, too.

I think your statements without qualification are dangerous. The basic principles that are inherent in all chromium barrels are somewhat the same. But this is not *quite the same as barrel plating zinc or cadmium. Wouldn't you agree?*

Yes, this is different than zinc or cadmium plating. But after all, the automatic, horizontal chrome barrel, as we know it in the United States, is basically a hollow cylinder. The anode is lead and it's perfectly round. Sure, you have to construct the setup so that it conducts current without losing voltage and having shorts, but essentially there isn't much difficulty as far as the barrel is concerned.

What type of bath do you use?

We use a proprietary bright nickel bath. Most of the modern bright nickels can be used as a base for barrel chrome plating. All of them are easily chromed in comparison with the nickels we were plating over ten or twelve years ago.

How quickly must you chromium plate after you barrel nickel plate?

We've delayed for two or three days before chromium plating and still had good results.

(continued)

"There are German barrels, English barrels and domestic barrels. Which is best?"

"We've tried to adjust our automatic machines so that they plate from 0.0001 to 0.0003 inch on anything that goes in and we don't weigh any of the parts."

Do you reactivate the surface in such cases?

On certain parts we have had to, but normally we wouldn't.

Have you ever tried barrel plating as much as a thousandth of chrome over nickel?

We chromium plated some ball bearings about an inch in diameter with a thousandth of an inch of chrome one time. It took quite a while and the deposit was very gray.

What's the rate of deposition in this process?

We average about 0.000003 inch in 12 minutes. We will all be in trouble if these automobile companies make us put 0.00001 inch of chromium on screws!

How big a load do you plate in a batch-type barrel?

It depends upon the type of work. Usually about 10 pounds.

How do you cool the solution?

We use heavily nickel plated plate-type heat exchangers.

On your continuous dummying of nickel solutions what is the current density?

About 5 to 7 a.s.f. at 3 volts—something like that.

How can you get uniformity of plate distribution over irregularly shaped parts? What can you do to the solution, rotation of the cylinder and voltage in order to get a uniform plate?

This is important in an automatic plating machine where you have the same size barrel but different areas of work from one barrel to the other. You want to come out with essentially the same thickness in all of your barrels. But when you plate a tiny screw in one barrel and a big bell in the next barrel, you're going to have variation. There are adjustments which minimize this variation, however. Brighteners, for instance, influence distribution. Some brighteners allow ten times as much metal to be deposited a quarter of an inch from the high-current-density end of the part as is being deposited a quarter of an inch from the low-current-density end. Other brighteners in zinc cut the ratio to about 2 to 1.

We found that by varying the concentrations of the materials in the bath as well as the additions of organics and brighteners, thickness can be controlled. We've tried to adjust our automatic machines so that they plate from 0.0001 to 0.0003 inch on anything that goes in, and we don't weigh any of the parts. We merely dump in enough so that the parts don't come out of the end of the barrel. We run thickness checks every hour or so as a precaution. Yet we haven't had bare threads on small screws or treed plating on larger parts. You have to make these checks yourself with your solution, because every solution is different. Adjust the cyanide, metal brighteners, and wetting agents. No thorough study has been made to

determine just exactly what you need in every solution.

In other words, by getting more even distribution, you might decrease your plating time?

You could plate more parts if you had more even distribution.

As I understand it you give yourself a tolerance of 3 to 1 in the thickness of the plate to allow for a volume-area ratio change. Do you think that your volume-area ratio changes three to one?

Ten to one.

It changes ten to one and you're only changing your thickness 3 to 1?

That's right. Some of the proprietary brighteners are better than others in helping this distribution problem. Some are very bad with respect to plate distribution. You can help by adjusting cyanide and metal content to the optimum value for your particular bath, temperature, and current density. But all this takes some time in the lab to know where you are with regard to distribution. You can't just alter any solution arbitrarily and say it's going to be better.

Would you raise or lower metal concentration of the bath to improve distribution?

In general you can reduce the metal content.

Along the same lines, what do you feel is the easiest way to maintain your metal content at a constant value?

If you've got a high-cyanide bath, and your temperature is high, metal content might rise. When the solution is warm a lot of zinc is going into solution. Then you should add a little cyanide and plate until the metal content is reduced. If this continually happens, possibly you should be using some carbon anodes or steel anodes to plate out some of your zinc. Fill your racks completely.

You might solve the problem by using a mixture of ball anodes and slab anodes. If we're working three shifts we use ball anodes, because they have a lot more area per pound. If we're down to a shift and a half or two shifts, we use slab anodes.

What's the best way to handle barrel plated, chromated parts to avoid nicking the chromate coating?

We govern ourselves according to the specifications we must meet. Some parts have to be taken out of the barrel after they have been zinc plated and put in a basket for chromating in order to pass the salt

(continued)

". . . this takes some time in the lab to know where you are with regard to distribution."

"Does length of barrel plating time influence thickness variation from part to part?"

spray test. Others can be chromated in the barrel. In order to pass a salt spray test 100 per cent, the parts have to be handled like eggs.

We've found that some chromate coatings are harder than others. They don't produce as deep a color but the film is harder and a little more abrasion resistant. You can slow the barrel during chromating and come out with fairly good corrosion resistance.

In which barrel would you get better distribution of plate—a long barrel with a smaller diameter or a short barrel with a larger diameter?

I think that would depend on the part that you are plating. If you're plating a part that rolls easily and keeps changing from the center of the load to the outside of the load, then you shouldn't have much trouble. Trouble comes when you plate a part that locks and won't move around inside the barrel.

"In order to pass a salt spray test 100 per cent, the parts have to be handled like eggs."

How should you determine the size of loads to be barrel plated?

In plating small parts, the load should be smaller than when plating large parts. But many loaders don't agree with this. If it is a tiny part they put more in and let it plate longer. That way they handle fewer loads. But it's poor practice.

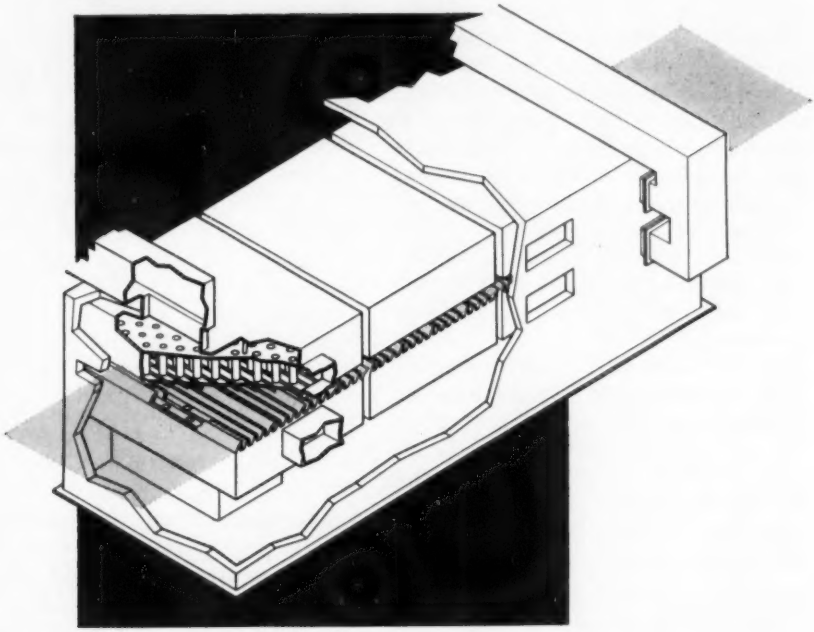
Does length of barrel plating time influence thickness variation from part to part?

In a study we made, length of time did not have much of an effect on thickness of plate from part to part. You always have to plate a large load longer to get the same *average thickness* produced in a shorter time when plating a small load. But you still get the *same number* of parts with *less than average thickness* and the same number with *more than average thickness*, regardless of load size.

When we reported the results of this study in a technical paper, many questions were asked about the concentrations of solutions. We went back and varied the concentration and checked again. We still found that all these measurements fit the basic curve that we had developed. In other words, in plating a certain average thickness, the

(continued)

High Velocity DRYERS



Paint Finishing · Metal Decorating · Rubber Curing
Strip Coating · Laminated Products · Material Drying

This Ross High Velocity Dryer makes maximum use of the hot drying air. It has effective distribution. Impact is suited to the material being dried. Temperatures can be closely controlled. The value of this unit lies in its ability to effectively dry fast-moving webs, making possible heavy production schedules.

If you have a drying problem and want the most modern dryer available, *this is it.*

J. O. ROSS

J. O. ROSS ENGINEERING/a division of Midland-Ross Corporation
730 Third Avenue, New York 17, New York
ATLANTA · BOSTON · DETROIT · LOS ANGELES · SEATTLE · MT. PROSPECT, ILL. · MOBILE

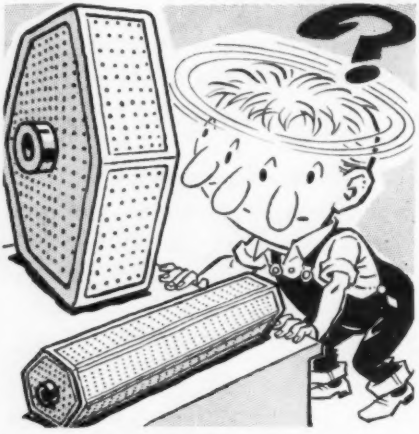
MR

For more data circle 356 on Postpaid Card

"If we want to be fairly positive that we're going to have 0.0002 inch thickness on all parts, we plate for an average thickness of 0.0003 inch."

minimum thickness was a certain value, and the maximum was a certain value. It all fit a basic curve no matter how much metal we had in solution or how little. The size of the load didn't seem to have much of an effect, either. This study was based on about 3,000 barrel loads and many measurements. We studied zinc plating and later we did the same work in cadmium plating (not to the extent that we did on zinc plating) and found the same answers.

If we want to be fairly positive that we're going to have 0.0002 inch thickness on all the parts, we plate for an average thickness of 0.0003 inch. These statements are based on measurements in zinc and cadmium. We have no proof that they would be true in other metals.



"In which barrel would you get better distribution of plate—a long barrel with a smaller diameter or a short barrel with a large diameter?"

What about barrel dimensions? A 14-by-36-inch barrel we ordered came back 12 by 36 inches, and I find that I'm getting better plating and just as many parts per load in a 12-inch barrel as I did in a 14-inch barrel. How do you explain this?

The portion of parts inside the load (that are not being plated) is probably less with the smaller barrel than it would be when you have a larger barrel. You don't have the mass buried inside that you have in a larger barrel. Actually you're deplating inside the load.

Has anyone had any experience with "impact coating" or "peen plating?"

We haven't had any experience with it, but we have had some parts run for us so that we could evaluate what it would do on a very fine, thin flat spring. We had been electroplating these springs and encountered hydrogen embrittlement even with excessive baking and care. Corrosion resistance of the "peen plating" was just as good as the zinc that we electroplated. However, we found that on this thin spring we lost quite a bit of the tension in the spring. Now on a heavier spring, you wouldn't notice anything. But on a real thin spring we did. We lost about two thirds of the tension. The electroplated spring's tension didn't change.

As far as licking all these hydrogen embrittlement problems is concerned, this process has some of the same problems. In order for the

plate to adhere to the part, scale must be removed. Thus you can still get into hydrogen embrittlement during acid pickling to remove scale.

What are some of the advantages and disadvantages of polypropylene as a material of construction for plating barrels?

This material has excellent impact resistance, good resistance to temperatures at which plating solutions operate, is inert to most plating chemicals. The biggest difficulty has been that polypropylene continues to grow after it's manufactured. It is not dimensionally stable for some time. Therefore, use of the "green" material could cause the holes in a plating barrel to become smaller after ageing. Research is being directed toward stopping this growth and there are methods of minimizing dimensional instability before the barrel goes into the field.

Additional copies *of this article are available as long as the supply lasts. Write PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio.*

Slides on Ultrasonic Cleaning of Printed Circuit Boards. A color-slide film and accompanying oral presentation on ultrasonic cleaning of printed circuit boards.

The 30-minute program discusses and demonstrates systems for cleaning printed-circuit boards using ultrasonics and "Freon" solvents. It covers variables in the flux-removing system, characteristics and categories of solvents. Also included in the presentation are testing methods used to determine whether the board is clean, cost data and information on equipment size and capacity.

At the end of the program, the process is demonstrated using circuit boards manufactured by the audience.

This presentation is available for the asking. Inquiries should be addressed to L. R. Jeffrey, National Ultrasonic Corp., 95 Park Ave., Nutley, N. J.

Coming Up

Watch for these useful articles in coming issues of PRODUCTS FINISHING, the leading publication in the finishing field:

Finishes for Architectural Aluminum
A survey of the many treatments and coatings that color aluminum and add to their durability . . .

Electroforming for the Space Age
Making metal parts by electrodeposition techniques plays a part in manufacture of the B-58 bomber and other airborne vehicles. Here's a report on Convair's electroforming processes . . .

Electroless Chromium Plating
A successful formulation for electroless chromium plating has been developed. It's easy to use and control, gives a uniform plate . . .

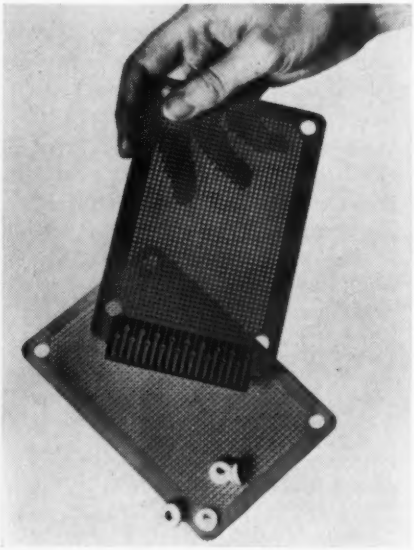
GE's Dual Paint System
It improves quality, speeds production, cuts costs . . .

Plating on Titanium Solves Manufacturing Problem
Ford Instrument Co. improves surface finish, salvages overmachined parts . . .

NEW PRODUCTS

Printed-Circuit Grid Boards

Two new configurations in Fotoceram printed circuit grid boards have been developed by Corning Electronic Components. One has corner mounting holes; the other has the mounting holes plus a plug section useful for computer design work.



Fotoceram printed circuit grid boards

The grid boards consist of copper-clad Fotoceram glass-ceramic with a grid of 0.052 inch through-plated holes set 0.1 inch on center. A designer lays out his circuit pattern on the grid with etching resist, then etches away the copper lying beyond the pattern. After this 15-minute etching process, the board is ready for components.

The boards are available in 4-by-6 and 6-by-8-inch sizes.

Manufacturer: Corning Electronic Components, Corning Glass Works, Bradford, Pa.

For more data circle **1** on Postpaid Card

★ ★ ★

Organic Coating Simulates Brass

An epoxy baking enamel called "Golden Glow" simulates brass when applied over almost any basis metal. The color can be varied from light yellow to deep gold. Automatic or electrostatic spraying equipment is required for application.

Manufacturer: Flood & Conklin, Industrial Finishes Div., 136 Chestnut St., Newark 5, N. J.

For more data circle **2** on Postpaid Card

Plating on aluminum made easy

WITH ALUMON "D" DILUTE ZINCATE

ALUMON "D"

BLISTER-FREE PLATING ON COMPLEX PARTS

Alumon "D" quickly penetrates blind holes, screw threads, grooves, other areas difficult to plate using ordinary zincate baths. Adhesion is excellent; solution rinses freely; and carry-over into plating baths is minimized. Parts shown are plated aluminum components of the U.S. Army Hawk missile weapons system produced by Raytheon's Aero-Weapons Division.

REDUCES DRAGOUT

Alumon "D" thin liquid drains rapidly, reducing solution dragout losses to a minimum. In laboratory tests on identical parts, the amount of solution dragged out of an Alumon "D" bath was less than 1/3 the amount dragged out of a conventional zincate bath. The amount of salts dragged out is less than 1/12 as much.

SHORTENS MAKE-UP TIME

Alumon "D" is easy to make up. One hundred gallons of solution requires addition of only 20 gallons of Alumon "D" Liquid (or 100 lbs. of Alumon "D" Powder) to water, compared with dissolution of 450-500 lbs. of powdered chemicals for a conventional bath. For detailed information, write today to: Enthone Incorporated, 442 Elm Street, New Haven 8, Conn.

ENTHONE

ANOTHER PRODUCT OF Enthonics RESEARCH

A Subsidiary of American Smelting and Refining Company ASARCO

For more data circle 357 on Postpaid Card

Inverted Emulsion Removes Buffing Compound

Enthol V-240 emulsion cleaner inverts at operating temperatures to a water-in-oil emulsion which enables heavily soiled work to be acted upon by 100 per cent hot solvent; the most tenacious soils are rapidly penetrated. Upon removal of the work from the cleaning solution, the entrained emulsion reverts to an oil-in-water form which rinses off easily.

Enthol V-240 is used at 5-10 per cent by volume in water. This solution is heated to 180-200 deg. F., if the invert qualities are desired. Immersion times of 2-10 minutes are usually sufficient. When the work is removed from the bath and allowed to cool to 150 deg. F., the emulsion reverts to an oil-in-water form and is easily rinsed off in cold water.

Enthol V-240 is intended to remove buffing and polishing compounds, oil, grease, drawing compounds, and grinding lubricants prior to pre-plate cleaning cycles. It's safe to use on steel, aluminum, copper, zinc die castings, and most other metals.

The product is primarily used as a soak cleaner but it is also effective in pressure-spray equipment for the initial removal of buffing-compound deposits. Additionally, this product may be added to alkaline cleaners to improve their cleaning action.

Manufacturer: Enthone, Inc., 442 Elm St., New Haven, Conn.

For more data circle 3 on Postpaid Card

For more data circle 358 on Postpaid Card

DRYING inks on plastic playing cards. Lights, darks and different colors dry at the same speed.

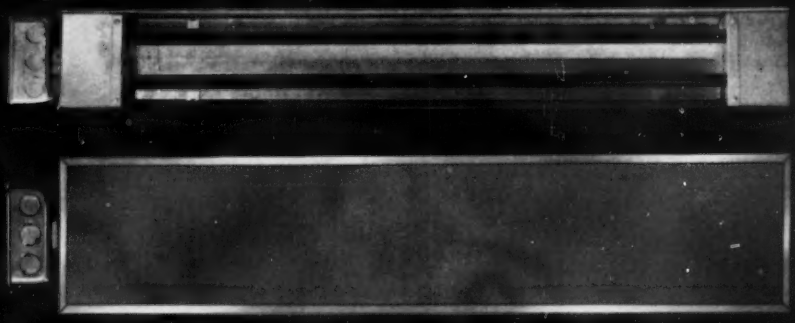
HEATING plastic boat windshields to make them pliable for shaping. Oven costs are down 50%.

DRYING several different colored paints on fire extinguishers. Rejects are down almost 100%.

CURING covers of book and record albums. Power costs have been reduced 66%.

DRYING lacquers on garment buckles. Faster by 90% than drying with hot-air ovens.

CURING the resin bond in alumina refractory blocks. Maintains uniform quality.



HOW TO SPEED, CUT AND SAVE WITH CORNING RADIANT HEATERS

If *you* heat, dry, or cure, Corning radiant heaters with far-infrared heat can give you these benefits:

Speed work—*all* colors dry at the *same fast rate.*

Cut rejects—scorching virtually eliminated because heaters run at lower temperatures.

Save on power costs—these heaters are 90% effective, less waste heat in the air.

TWO TYPES FOR DIFFERENT JOBS. VYCOR® Tubular Heaters are best where you need fast heat-ups and cool-downs. PYREX® Panel Heaters give uniform heat over wide areas.

NEW BULLETIN. Get details from a new 16-page bulletin. Write: Industrial Components Sales Department, 9606 Crystal St., Corning, N. Y.

CORNING GLASS WORKS
CORNING MEANS RESEARCH IN GLASS

For more data circle 359 on Postpaid Card

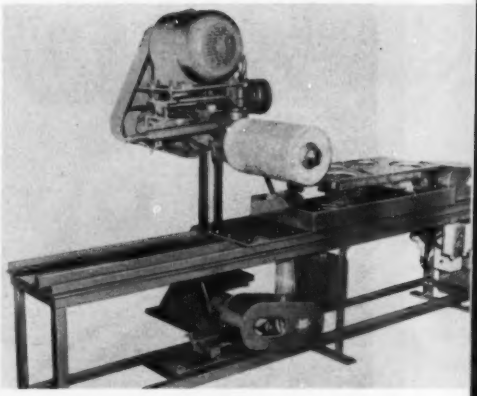
New Products . . .

Straight-Line Buffing Machine Has Oscillating Fixture for Finishing Flat Parts

An automatic reciprocating-type straight-line buffing machine for buffing surfaces of flat parts such as stainless steel stove tops, table and sink tops, brass name plates, kick plates and grille work.

The machine consists of an oscillating work-holding fixture mounted on a reciprocating platen. A floating-head, fully adjustable lathe performs the finishing operations as the part is reciprocated and oscillated under the buffing wheel. A solenoid-operated timer permits the work to reciprocate under the wheel for a predetermined time.

The oscillating fixture provides uniform wheel wear, eliminates buff streaking and permits the use of buffing lathes that do not incorporate stroking-type spindles.

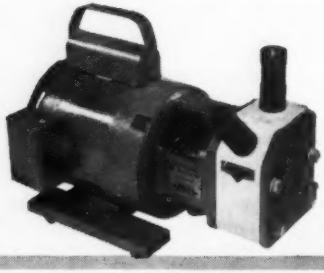


Acme reciprocating straight line buffing machine finishing stainless steel stove tops.

Manufacturer: Acme Manufacturing Co., 1400 E. Nine Mile Rd., Detroit 20, Mich.

For more data circle 4 on Postpaid Card

ONLY VANTON SEALLESS PLASTIC PUMPS have all these exclusive features:



- No Shaft Seals— No Stuffing Boxes
- Self-Priming— Non-Agitating
- Non-Contaminating
- Do not leak
- Operate dry or wet
- Handle corrosive chemicals, gases and slurries with equal ease
- Capacity range to 40 GPM
- Temperature range from — 60°F. to + 350°F.
- 54 combinations of materials such as Teflon, PVC, Kel F, Hypalon and Neoprene

WRITE FOR CATALOG #10

VANTON

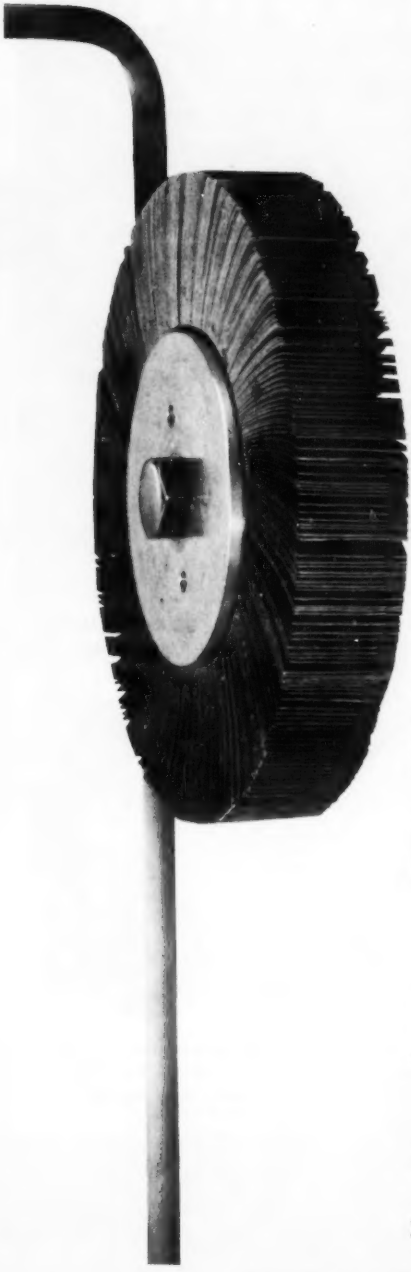
PUMP AND EQUIPMENT CORP.

DIVISION OF COOPER ALLOY CORPORATION

HILLSIDE, NEW JERSEY

VP100

For more data circle 360 on Postpaid Card



3MAGINATION
in GRINDING
and FINISHING

"PG" WHEEL REDUCES FINISHING TIME 50%

Stainless steel sink frames, manufactured by R. D. Werner Co., Inc., Greenville, Pa. are satin finished in half the time using the "PG" Wheel. Recommended by a 3M representative to replace a previous method, this unique 3M abrasive tool has practically eliminated rejects while producing a more consistent final finish.

COST CHECK 5-4-5 **Why not let 3M's new COST CHECK 5-4-5 Program help you to effectively investigate ways to lower costs and increase production. Discover...**

- If your grinding can be done more economically
- If your finishing is as efficient as possible
- If your polishing can be done faster and better

Send today for a free COST CHECK 5-4-5 Review Form without obligation. Put 3M's years of abrasive know-how at your disposal. Write: 3M Company, 900 Bush Avenue, St. Paul 6, Minn. Dept. ABE-121.

3M COATED ABRASIVES

"3M" AND "PG" ARE REGISTERED TRADEMARKS OF 3M CO., ST. PAUL 6, MINN.

MINNESOTA MINING AND MANUFACTURING COMPANY
...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

For more data circle 361 on Postpaid Card

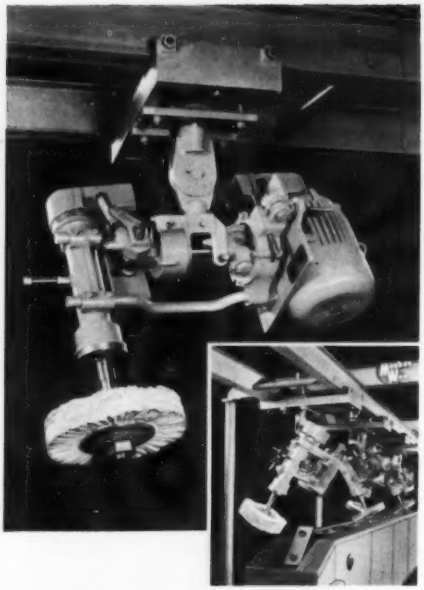
Overhead-Mounted Buffing Head

An overhead-suspended buffing and polishing lathe recently introduced by Murray-Way Corporation is said to save floor space and offer full wheel contact with irregular work shapes.

These heads may be placed much closer together than floor-mounted heads which require clearance for adjustments by the operator. Easy access is afforded to both conveyor and heads, and clean-up is simplified.

Where conventional heads employ one fulcrum which allows the work wheel to rise and fall with the contour of the work piece in only one plane, the Murray-Way No. 052 Head utilizes two fulcrums, affording a more flexible, universal-type movement of the work wheel, enabling it to follow

(continued)

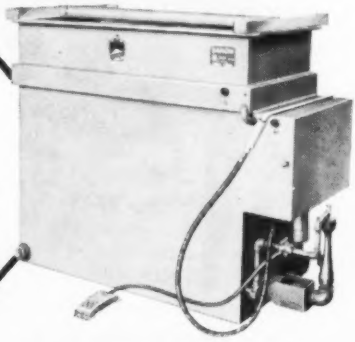


Murray-Way Overhead-Mounted Head

Lower Initial Cost ...Lower Operating Cost

BARON

NEW BARONET VAPOR SPRAY DEGREASER



All the quality...all the performance features of the heavy duty industrial models at far less cost. Includes:

- New solvent saving Econ-O-Lid roll cover.
- Corrosion resistant phenolic coating.
- Water jacket completely encircles machine.
- Auxiliary copper finned tube condenser.
- Water separator.
- Large spray pump capacity.
- Leakproof spray pump with foot switch control.

Gas, Steam, Electric Models 2' to 10' lengths. From **$495.00.**

Write for catalog **BARON INDUSTRIES**
241 West Avenue 26, Los Angeles 31, California

For more data circle 362 on Postpaid Card

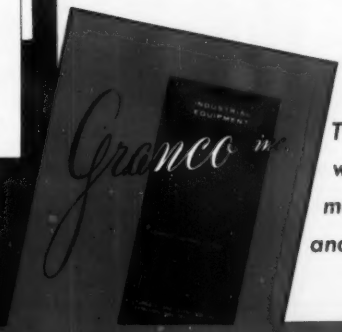
COMPLETE FINISHING SYSTEMS – FROM START TO FINISH

GRANCO carries industrial finishing systems from the drawing board to the completed, operating installation.

GRANCO FREE CONSULTING ENGINEERING SERVICE is at your disposal to analyze your finishing needs and plan a system that will meet them. *INSTALLATIONS ARE IN LEADING MANUFACTURING PLANTS WHERE METAL FINISHING IS DONE.*

GRANCO FINISHING SYSTEMS ARE FULLY TESTED and proved in actual use. Underwriters approve safety equipment. Granco installations are *ENGINEERED FOR HIGH PRODUCTION AT LOWER COSTS* and long dependable service.

These letters are all case histories of successful manufacturers who use Granco complete finishing systems.



Telephone, wire, write today for more information and free literature

GRANCO INC. 317 32nd St., S.W. • CHerry 5-0591
Grand Rapids 8, Michigan

For more data circle 363 on Postpaid Card

closely an irregular shape in two planes simultaneously. Two simple fulcrum adjustments determine the degree of angularity and accurately position the wheel.

Heads are easily raised or lowered over the conveyor by means of a threaded stud and nut. The carriage which supports the heads may be moved "in line" or at a right angle to the conveyor path. Adjustable stops control float of the heads.

Manufacturer: Murray-Way Corp., P. O. Box 180, Birmingham, Mich.

For more data circle **5** on Postpaid Card

★ ★ ★

Organic Coating Adheres Well on Untreated Aluminum

Uniclad Formula AD is a single-component organic baking finish that adheres to aluminum that has been degreased. No additional pretreatment is needed in most cases. The coating produced is hard, won't chip or peel, withstands humidity tests of over 2000 hours. Available in clear or colors, from high gloss to flat.

Manufacturer: Universal Paint & Varnish, Inc., 7172 Northfield Rd., Bedford, Ohio.

For more data circle **6** on Postpaid Card

★ ★ ★

Cleaner for Barrel Processing

A heavy-duty cleaner for zinc and steel is designated Patclin No. 336. The highly alkaline product quickly removes oxide surfaces from zinc and brightens the surface. Used on steel, it removes smuts, stamping and drawing compounds and oils. Used on brass or copper-bearing alloys, it causes no darkening or discoloration.

Manufacturer: Patclin Chemical Co., Inc., 11-23 Casimir Ave., Yonkers, New York.

For more data circle **7** on Postpaid Card

For the "Solution to your Plating Problems" . . . . come to
JELCO
new Hi-Speed bright copper plating . . . right out of the barrel!
BARREL COPPER Brightener . . . can be used in your present regular solution with standard equipment
One of America's leading manufacturers
• BRASS Additive
• COP-BRITE
• BARREL COPPER Brightener
• BARREL NICKEL Brightener
• The only ONE brightener required —cuts operating costs
• Tops in throwing power—produces complete coverage immediately
• Doubles your plating rate— increases production
• Eliminates cyanide fumes
A Proven Process!
Used successfully by job platers and manufacturers
Non-Critical
Boosts Production
Cuts Rejects
For technical information, complete details and prices . . . write to
JELCO Finishing Equipment Corp.
153 East 26th Street, New York 10 • Phone LExington 2-3055

For more data circle **364** on Postpaid Card

For the finest protection of polished brass . . . .

NIKOLAS *is* FIRST!

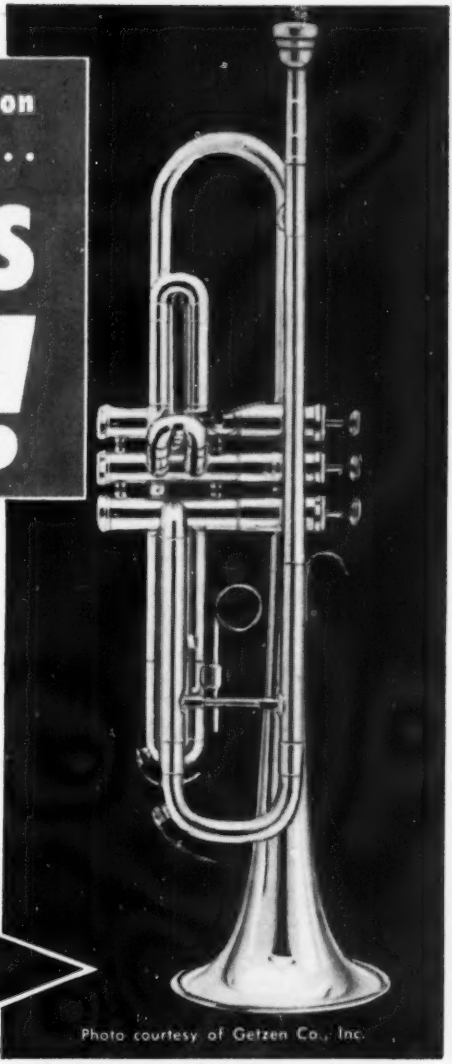


Photo courtesy of Getzen Co., Inc.

More brass musical instruments are protected with Nikolas clear lacquers than all others combined. If your product's reputation demands lasting protection — the quality of Nikolas Lacquer speaks for itself.

Since 1890

NIKOLAS

Write, wire or call for information, samples and recommendations

G. J. NIKOLAS & CO., Inc.

2880 WASHINGTON BLVD.
BELLWOOD, ILLINOIS

Since 1890

33 GRAND STREET
BROOKLYN 11, N. Y.

For more data circle 365 on Postpaid Card

Conversion Coating for Painting Zinc Die Castings

Kenvert No. 11-X powder dissolves in water to make a solution which produces an olive drab coating on zinc. This coating is an excellent base for paint, greatly improves corrosion resistance.

The stable, self-balancing solution operates at room temperature, requires no acid additions. Film may be used on cadmium also. Passes 96-hour salt spray. Good wet film strength makes possible bulk treating.

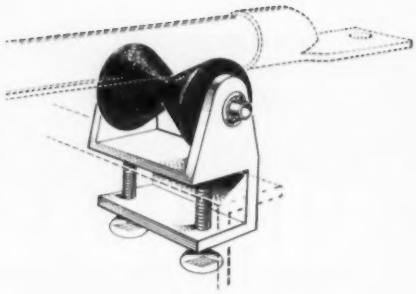
Manufacturer: Conversion Chemical Corporation, Rockville, Conn.

For more data circle **8** on Postpaid Card

★ ★ ★

Clamp-On Tank-Rod Insulators

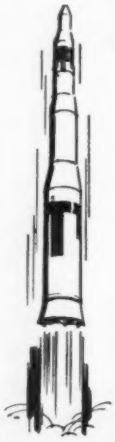
Tank-rod insulators that clamp on the rim of a plating tank without drilling holes completely insulate the cathode rod from the tank. One size fits all rods. The clamp can be removed easily for cleaning or relocation.



Daniels Clamp-On Tank-Rod Insulator

Manufacturer: Daniels Plating Barrel and Supply Co., 129 Oliver St., Newark 5, N. J.

For more data circle **9** on Postpaid Card



TAKE OFF

IS WHAT YOU GET WHEN YOU USE

Electro NON-FLAMMABLE

NO CURRENT
NO HEAT Cold Stripper

All walks of industry from Coast to Coast use ELECTRO COLD STRIPPER—consider it to be indispensable to their finishing system.

If you have a PAINT STRIPPING problem and want a quick economical answer write for literature and free testing sample.

ALLIED FINISHING SPECIALTIES CO.

2643 W. GRAND AVENUE • CHICAGO 12, ILLINOIS • PHONE: AR 6-2222

For more data circle 366 on Postpaid Card

Harshaw's New 15-Gallon Fluoborate Container

(Fibre, polyethylene lined)

Harshaw is FIRST AGAIN—This time with 15-gallon non-returnable containers for our Fluoborate Plating Solutions. Harshaw, in 1957, was first to use 5-gallon non-returnables.

DEFINITE SAVINGS in work, time, and money are immediate benefits when you order Harshaw Fluoborates in this new polyethylene lined fibre container. Check these advantages:

- No increase in product price
- No containers to return
- No records to keep
- No container deposit
- No return freight charges
- Less freight on incoming shipments
- Lighter containers
- Easier to handle
- Vented surge free pouring
- Specially designed for easy stacking
- Standardized type and size containers

These Harshaw Fluoborates are available now in either 5 or 15 gallon non-returnable containers. Order them by mail or phone.

- Cadmium Fluoborate Solution
- Copper Fluoborate Solution
- Fluoboric Acid
- Hydrofluosilicic Acid
- Lead Fluoborate Solution
- Nickel Fluoborate Solution
- Tin Fluoborate Solution
- Zinc Fluoborate Solution

The Harshaw Chemical Co. 1945 E. 97th Street • Cleveland 6, Ohio

Chicago, Illinois • Cincinnati, Ohio • Cleveland, Ohio • Detroit, Michigan • Houston, Texas • Los Angeles, California
Hastings-On-Hudson, N.Y. • Philadelphia, Pennsylvania • Pittsburgh, Pennsylvania

For more data circle 367 on Postpaid Card

Barrel Zinc Brightener: Improved Solubility, Stability

Econobrite-117 is a modification of R. O. Hull's recently introduced Econobrite "one-shot" barrel zinc brightener. It is more soluble in the plating bath so that bath preparation is speeded, and more stable to better withstand variables in temperature, contamination, concentration. Excellent brightness, throwing power. Low cost.

Manufacturer: R. O. Hull & Co., Inc., 1260 Marion Ct., Cleveland, Ohio.
For more data circle 10 on Postpaid Card

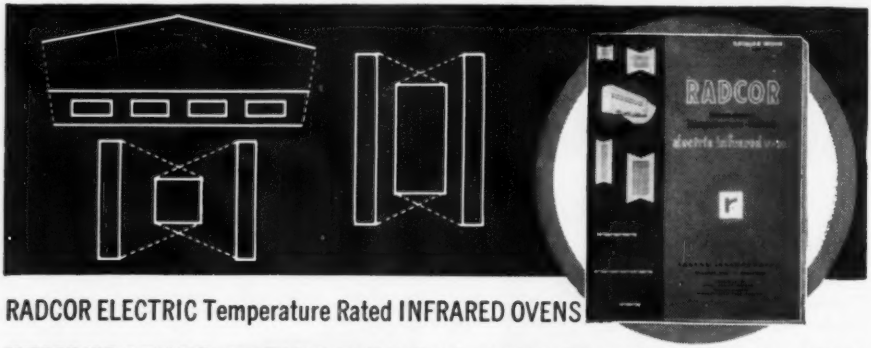
★ ★ ★

Anti-Static Tack Cloth

Detro Mfg. & Sales Co. has introduced a tack cloth that's chemically treated to prevent developing static charges on the surfaces being cleaned. The non-flammable cloth attracts dust and dirt without charging the surface. When a surface is charged while being wiped, it re-attracts the dust and lint being removed.

Detro Anti-Static Tack Cloth

Manufacturer: Detro Mfg. & Sales Co., Culver City, Calif.
For more data circle 11 on Postpaid Card



RADCOR ELECTRIC Temperature Rated INFRARED OVENS

TEMPERATURE-RATING FITS THE OVEN TO THE JOB—Exactly!

New, standard infrared ovens fitted to your product and time-temperature requirements. Temperature range from 235°F. to 660°F. New Radcor Infrared Oven Catalog shows you how to save money, get the exact performance you need, cut costs and, incidentally, take the mystery out of oven selection.

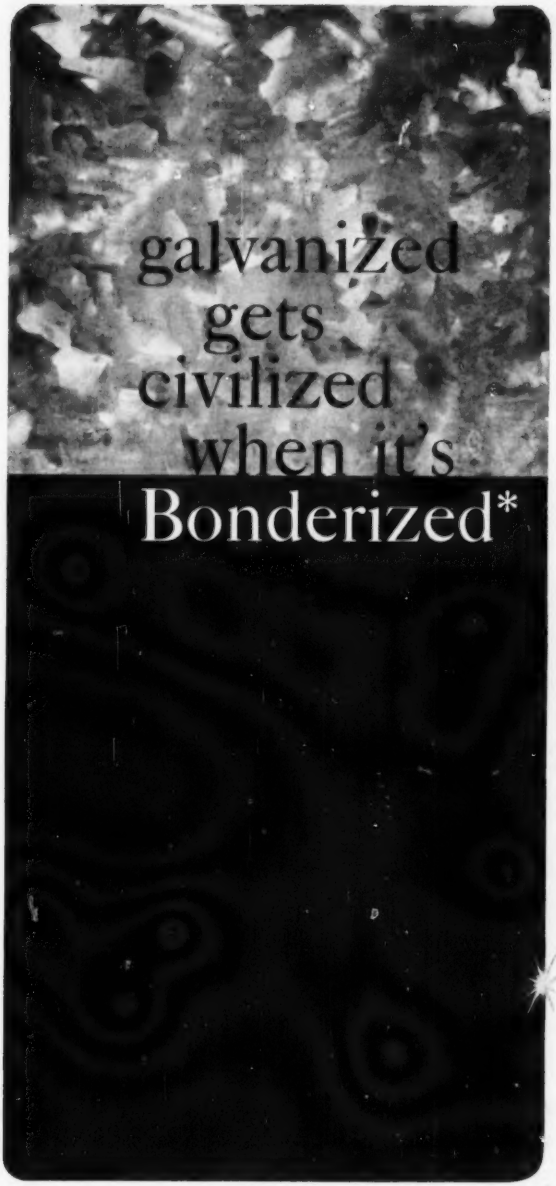
r

RADCOR, INC.
ELECTRIC HEATING SYSTEMS
Dept. E, P. O. Box 432 • Fostoria, Ohio
A Subsidiary of Edwin L. Wiegand Company

Write for Radcor Catalog BRG-115 Today!

R-4

For more data circle 368 on Postpaid Card



Galvanized is great for corrosion resistance, but it's a bad actor when you try to paint it.

Bonderite* phosphate coating tames that galvanized surface and makes it take and hold paint like a long-lost brother. What's more, the same Bonderite that's so good for galvanized is as effective on plain steel as any Bonderite in the list.

Now you can use a combination of painted steel and galvanized components for extra corrosion resistance, top appearance and customer satisfaction.

Write, today, for full information. Parker Rust Proof Company, 2172 E. Milwaukee, Detroit 11, Michigan.

PARKER

FIRST IN SURFACE TREATMENTS FOR METALS SINCE 1914

*Reg. U.S. Pat. Off.

Photo shows bare galvanized surface (top), Bonderized surface (center), paint over Bonderite (bottom).

For more data circle 369 on Postpaid Card

a new concept for the anodizing industry

TI-CORE® RACK SYSTEM* combining the corrosion resistance of titanium with the conductivity of aluminum, including a family of adaptable accessories

Write or call today for illustrated brochure.

*Patent Pending

Ti-Core is a rack **system.** The titanium & aluminum spline is a permanent fixture. It will not deteriorate. Corrosion resistant titanium accessories can be fitted to the spline in limitless variations making the Ti-Core System adaptable to any job.

Check these production benefits:

1. Ti-Core lasts, resists corrosion.
2. Provides proper current throughout.
3. Unlimited adaptability.
4. Light weight.
5. No stripping, no loose parts to tighten and adjust.
6. Reduces your rack inventory.

Continental Rack Company, Inc.
7001 Santa Monica Boulevard
Los Angeles 38, California
HOllywood 9-8383, Teletype LA 1212

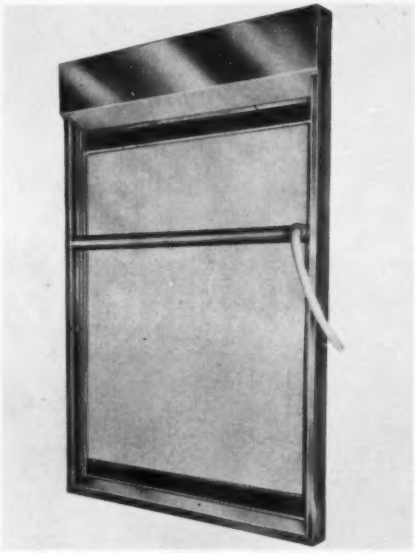
For more data circle 370 on Postpaid Card

New Products . . .

Self-Cleaning Air Filter Has Permanent Filter Media

An air filter with permanent filter media and a moving vacuum cleaner which removes solids from the surface of the filter.

To achieve constant flow of filtered



Honan Constant-Flow Air Filter

air, the vacuum tube traverses the permanent filter surface on a governable cycle. A flexible hose connects the moving tube to the vacuum and disposal container.

Honan Constant-Flow Filters can be installed over existing filter housings. Their operation can be coordinated with electrostatic precipitators, moving curtain filters and roll-type, self-renewing filters, if desirable.

Manufacturer: Honan Associates, Inc., Dept. NP 312, P. O. Box 271, Lebanon, Indiana.

For more data circle **12** on Postpaid Card

Tree coating by Cosden Paint Co., Beverly, N. J.

Aluminum trees are colorful with BUTON® Resins!

New BUTON resins from Enjay form the tough, durable coating that helps keep aluminum Christmas trees shining brightly. BUTON resins provide coatings with excellent adhesion to aluminum at low costs. Their ability to cure at high temperatures as well as with conventional baking permits high-speed production-line coating.

BUTON also adds extra sales appeal to many of the products that go underneath the Christmas tree. Users of appliance and automotive primers, container coatings, metal strip coatings, furniture lacquers and other surface coatings have much to gain from a closer acquaintance with BUTON resins. This versatile new resin series offers such important advantages as high gloss, rapid cure, chemical resistance and excellent adhesion, not only on aluminum, but also on an unusually wide variety of other substrates.

For application information, write to Enjay, 15 West 51st Street, New York 19, N. Y.

EXCITING NEW PRODUCTS THROUGH PETRO-CHEMISTRY

ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY

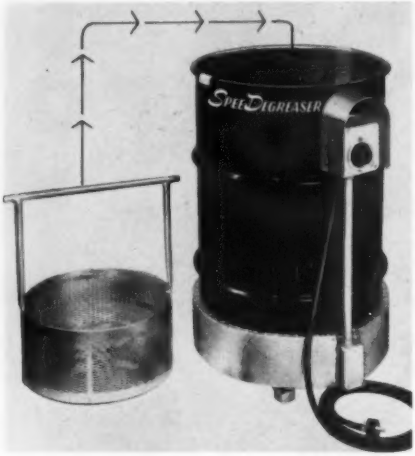
ENJAY

For more data circle 371 on Postpaid Card

New Products . . .

Simple Degreaser

The Acrawatt Speedegreaser consists of a drum with wraparound heating element, electrical control, and



SpeeDegreaser: for small plants, departmental use in large plants

a dipping basket. The solvent used is non-flammable perchlorethylene.

Vapor is formed by heating the four gallons of "perchlor" in the drum. When a basket of parts is lowered into the drum, the vapors condense on the parts and grease is removed.

Parts may be immersed in the fluid before vapor degreasing, if desired.

Manufacturer: Acra Electric Corp., Franklin Park, Ill.

For more data circle **13** on Postpaid Card

★ ★ ★

Spray-Booth Filter Pad Has Less Resistance to Air Flow

One 2-inch pad is said to do the work of the two 1-inch pads now commonly used in removing paint solids from spray booth exhaust air. The Fiberglass pad becomes progressively more dense toward its back side. This

(continued)

AG Filter: less airflow resistance

YOUNG BROTHERS *Baking and Drying* **OVENS**

designed and built for every product and process requirement

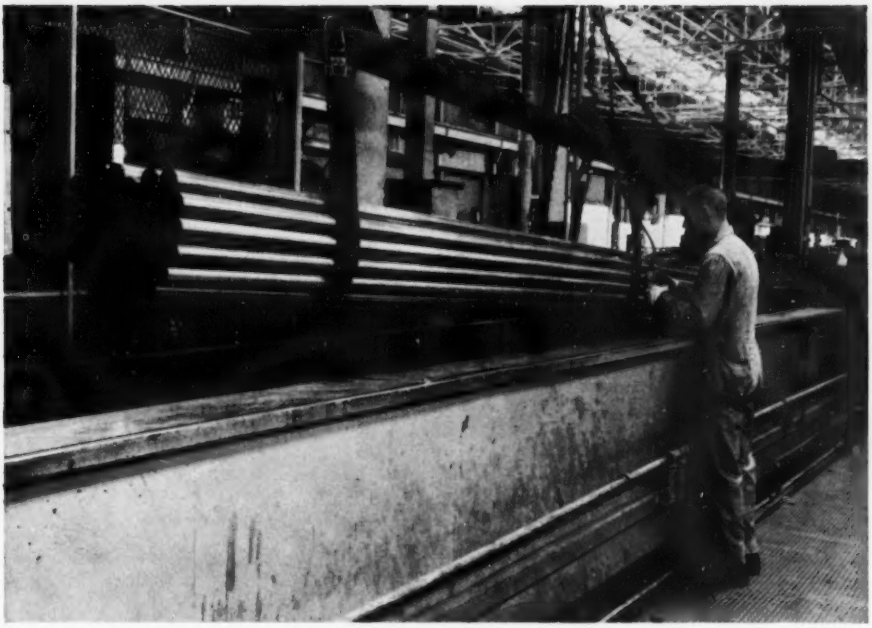
Batch and Conveyor types up to 1000° F.

Write for Bulletin 157

YOUNG BROTHERS CO. 1830 Columbus Road Cleveland 13, Ohio

Over 60 years of service

For more data circle 372 on Postpaid Card



Tubes ready for a Nialk Trichlor degreasing bath at Wolverine Tube Division of Calumet & Hecla, Inc., Decatur, Alabama.

HOW WOLVERINE TUBE CUTS DOWN DEGREASER CLEANOUTS

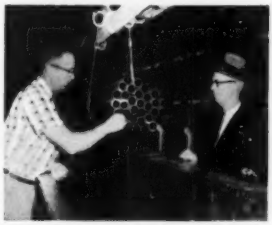
Cleaning the inside of a one-inch by thirty-foot copper tube sets up a problem.

Yet Wolverine Tube, Division of Calumet & Hecla, Inc., removes dirt and chips from these and gets them immaculate while maintaining widely spaced cleanout schedules.

The answer lies in the utilization of Hooker's Nialk® TRICHLORethylene, the solvent with *psp*—permanent staying power—in its stabilizer.

It keeps the bath from going acid, even with bits of metal in it. And it lets Wolverine use baths for tube operations three months before cleanout.

The tubes are cleaned at many stages. "We cannot use a solvent that might stain the walls of the tubing," says Dalton F. Jackson, metallurgist in the technical section. "Nialk Trichlor does not stain."



D. F. Jackson (L) of Wolverine and W. A. Ames (R) of Wittichen Chemical Company, Birmingham, Alabama, distributor for Nialk Trichlorethylene, examine degreased tubing.

Wolverine finds the system of degreasing tubes in vapor of Nialk Trichlor and then spraying them with pure condensate of the same solvent highly efficient.

The contaminated solvent from the degreaser is distilled and re-used. "Even after distilling it many times, Nialk still maintains a highly effective degreasing potential," Jackson says.

He is very satisfied with Hooker's technical service. "Whenever we have called for help, they have sent a representative promptly."

You can have the same benefits—regardless of the metals you're working with.

Talk to your Hooker Chemical distributor. Or write us. Our years of experience are yours for the asking.

HOOKER CHEMICAL CORPORATION

1412 UNION STREET, NIAGARA FALLS, NEW YORK

HOOKER CHEMICALS PLASTICS

Sales offices: Buffalo, Chicago, Detroit, Los Angeles, New York, Niagara Falls, Philadelphia, Tacoma, Worcester, Mass. *In Canada:* Hooker Chemicals Limited, North Vancouver, B.C.

For more data circle 373 on Postpaid Card

is said to provide resistance to "face loading" and thus lengthen service life.

Absorption qualities of these pads are said to be excellent. Three sizes are available.

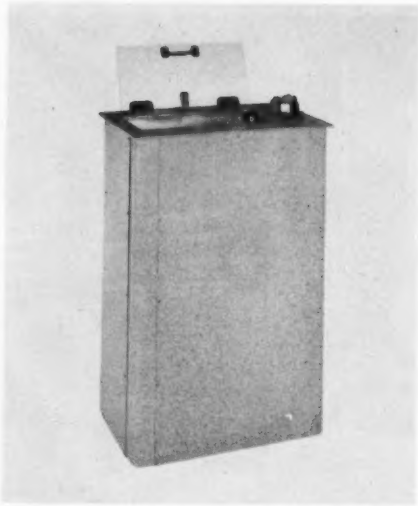
Manufacturer: American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Kentucky.

For more data circle 14 on Postpaid Card

★ ★ ★

Spray-Mask Washer

A high-pressure washing machine for removing paint from masks handles masks as large as 16 by 16 inches, requires only five gallons of solvent. The unit is said to strip masks in half



Conforming Matrix Spray Mask Washer

ACME IN ACTION

Doi

The die-cast part being "mush" buffed at right happens to be an automotive accessory having recessed, contoured surfaces. But it could be almost any other type of limited production part presenting similar finishing problems because the equipment performing the operation is a versatile Acme Semi-Automatic Polishing and Buffing Machine. Note that the ruggedly built work holding unit has an adjustable horizontal stroke that distributes wear evenly across the buffing wheel. Note, too, that the exclusive Acme oscillating head attachment simultaneously rotates the part and moves it vertically above and below the center line of the wheel to assure maximum coverage, greater uniformity of finish. Matter of fact, this unique combination of movements and motions—this added Acme action—does so much more work so much better that two operations can often be combined into one!

Want complete information about this and other Acme semi-automatic finishing equipment? A catalog is yours for the asking.

Comprehensive catalogs available upon request. Write, wire or call:

ACME MANUFACTURING COMPANY

1400 E. 9 Mile Road • Detroit 20 (Ferndale), Michigan • JOrdan 6-1550

Leading Producers of Automatic Polishing, Buffing and Deburring Machines Since 1910

For more data circle 374 on Postpaid Card

the time required for manual soaking, brushing and cleaning. Ordinarily it will remove up to 20 wet coats of paint in 20 seconds.

Manufacturer: Conforming Matrix Corporation, 783 New York Ave., Toledo 11, Ohio.

For more data circle 15 on Postpaid Card

★ ★ ★

Epoxy Resin Requires No Catalyst

Eponol® 55, an epoxy resin which requires no curing agent or catalyst, has been developed by the Plastics and Resins Division of Shell Chemical Company.

Eponol 55 makes possible one-package epoxy-type coatings with lacquer-type dry. By solvent evaporation alone, Eponol 55 forms a film that outperforms many other types of coatings.

Characteristics of Eponol 55 coatings include toughness, hardness, flexibility, abrasion and chemical resistance and electrical nonconductivity. Single coats, either clear or pigmented, are often all that is required for protection of metal products. Where multi-coats are required, primers of Eponol 55 provide excellent adhesion to the substrate and an easy-to-bond-to base for subsequent coats.

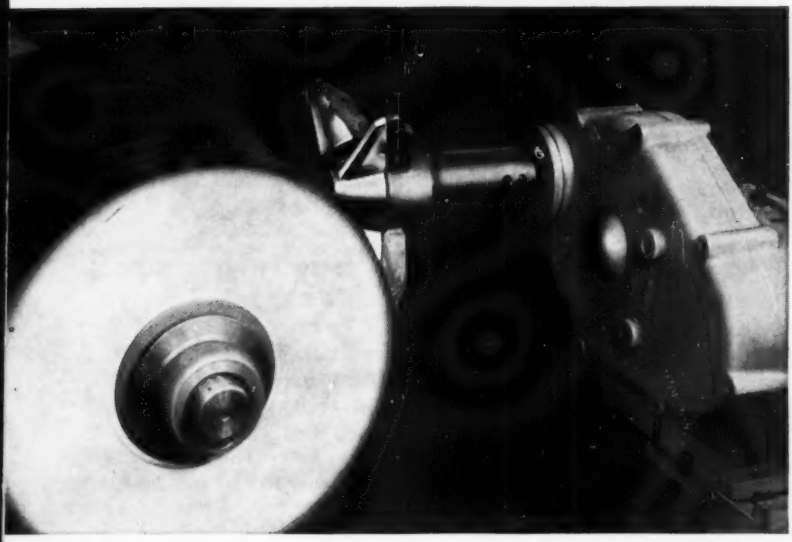
It is expected that lacquers based on Eponol 55 will be available in retail stores in aerosol cans. Shell Chemical has already successfully packaged Eponol 55 formulations in this way.

Developer: Plastics and Resins Div., Shell Chemical Co., 50 W. 50th St., New York 20, N. Y.

For more data circle 16 on Postpaid Card

more work with

Movement and Motion



Paint Stripper Is Harmless to Rubber, Plastics

Dytex No. 12 Stripper is a specially compounded alkaline material that removes almost any organic coating from ferrous metals, acrylic plastics and golf balls. It has little or no effect on most types of rubber, is harmless to many plastics.

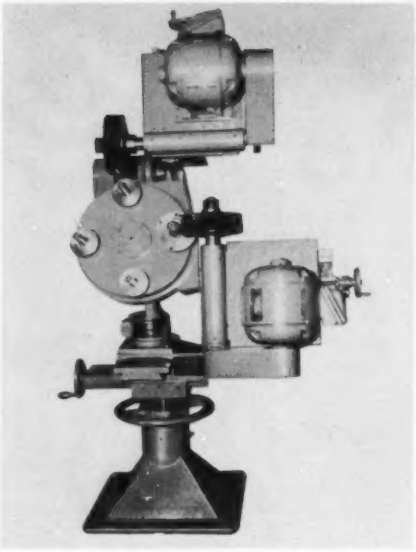
Manufacturer: Dytex Chemical Co., 144 India St., Providence 3, R. I.

For more data circle **17** on Postpaid Card

★ ★ ★

Automatic Machine Polishes Circular-Shaped Parts

Acme polishing machine handles parts up to seven inches in diameter. It consists of a 4-spindle automatic index machine with two integral finishing heads. Up to three separate finishing operations can be performed by this unit.



Acme automatic buffing and deburring machine finishes circular-shaped parts at rates of 235 to 750 per hour.

Applications include finishing motor rotors, knobs and handles, spur gears, escutcheons.

The machine can be used with existing backstand lathes and can be supplied without integral finishing heads if the user desires.

Manufacturer: Acme Manufacturing Co., 1400 E. Nine Mile Rd., Detroit 20, Mich.

For more data circle **18** on Postpaid Card

★ ★ ★

Demineralizers Equipped with Automatic Starting, Stopping, and Regenerating Controls

Barnstead Still and Sterilizer Co. has developed automatic starting, stopping, and regenerating controls for its

(continued)

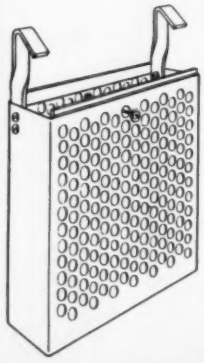
IN STOCK

ALL TITANIUM ANODE BASKET

TITANIUM PRODUCTS CORP.

9301 FRENCH RD., DETROIT 13, MICH.

WALNUT 1-3800



3″ x 12″ x 12″ **$55.00**

3″ x 12″ x 18″ **$65.00**

3″ x 12″ x 24″ **$75.00**

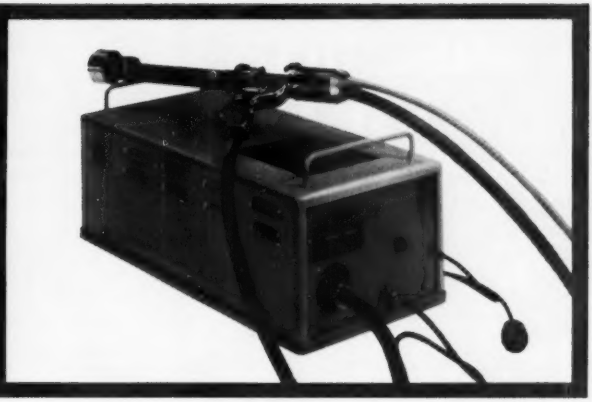
3″ x 12″ x 30″ **$85.00**

3″ x 12″ x 36″ **$90.00**

(other sizes to order)

For more data circle 375 on Postpaid Card

NEW



Sames "STAJET"

PORTABLE POWDER SPRAYER

Provides electrostatic application of all dry powders, thermosetting plastics & enamels for industrial coating operations... Sheet Metals, Textiles, Fabricated Materials, Finished Products...

Features:

- Uniform coverages for irregular shapes, sizes or contours.
- Excellent adherence, using charged particle principle.
- Maximum Safety: Electrical discharge is harmless to operating personnel. No material over-spray requiring masks or spray booths.
- Portable/Mobile: Complete unit weighs less than 70 lbs.

Includes: 90 KV Generator, Spray Gun, Powder Container with Vibrator & Feed Control, Air-Material Hose & Cables.

Sames

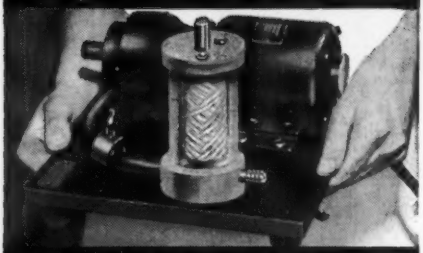
Write now for technical literature:

SAMES

Dept. 712, 30 Broad Street
New York 4, New York

For more data circle 376 on Postpaid Card

miniature
10 and 25 g.p.h. FILTER SYSTEMS



for laboratories, pilot plants and small batch process industries

filters and circulates sensitive corrosive precious solutions·solvents

Model LAI-1 up to 10 g.p.h. **$98**

Model LAI-3 up to 25 g.p.h. **$125**

features:

- Needs only 8" x 9" bench space
- Lucite (140°F. max.) or pyrex-epoxy (250°F. max.) chambers, also teflon, etc.
- Dynel, porous stone or porous carbon filter tubes
- Leakproof epoxy centrifugal pump
- Self-primer available
- Continuous duty ball bearing motor

FREE BULLETIN

Send for your Sethco Bulletin 602 for complete technical data on LAI portable filter systems today.

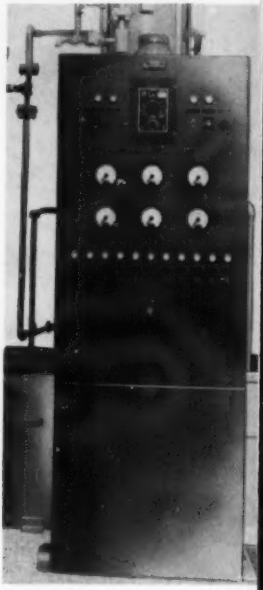
Sethco MANUFACTURING CORP.

2292 Babylon Turnpike, Merrick, N. Y. MA 3-4220

For more data circle 377 on Postpaid Card

line of mixed-bed, two-bed, and four-bed demineralizers.

These controls provide automatic regeneration of ion-exchange resins when they become exhausted. The automatic regeneration includes automatic back-wash, regeneration with



Barnstead Demineralizer: automatic start, stop, and regeneration controls

acid and caustic solutions, and rinsing of the resin beds. When regeneration is completed, the equipment returns to service automatically. The timing of each step in the regeneration procedure is individually adjustable to meet specific conditions and all valves have optional manual operation.

In addition to automatic regeneration, the controls provide purity safeguards for continuous testing of the demineralized water being produced. Water of sub-standard purity is automatically diverted to waste until the

(continued)

Sethco
MFG. CORP.
Now, HIGH TEMPERATURE TO 250° F.
SUBBA-5, -10 and -20
SUBMERGED FILTER SYSTEMS
with totally enclosed, ball-bearing, continuous duty, fan-cooled, 3400 r.p.m., 1/4-1/2 h.p., brushless AC motor.
SUBBA-5 price, includes 1/4 h.p., AC motor, Stainless Steel Mounting Brackets and Hose
$215
Model SUBBA-5
ONE YEAR GUARANTEE
FOR COMPLETE SPECIFICATIONS SEND FOR DATA SHEET 551B
JET AGITATION INDEPENDENT OF FILTRATION
Sethco
MANUFACTURING CORP.
2292 Babylon Turnpike,
Merrick, N. Y.
MA 3-4220
DEPTH FILTRATION FOR ALL ELECTROPLATING AND INDUSTRIAL APPLICATIONS • METAL FINISHING • PHOTO PROCESSING • PETROLEUM • SOLVENTS • LACQUERS • PHARMACEUTICALS • ULTRASONIC CLEANERS • RADIOACTIVE SOLUTIONS • WATER • ELECTROTYPING

For more data circle 378 on Postpaid Card

condition upsetting pre-set purity has been corrected.

A full tank of demineralized water is maintained automatically with a level-monitor device activating the equipment when water level in a storage tank drops below a pre-set level.

Manufacturer: Barnstead Still and Sterilizer Co., 317 Lanesville Terrace, Boston 31, Mass.

For more data circle 19 on Postpaid Card

★ ★ ★

Portable Electric Infrared Panels

Electric infrared portable heat panels that can be formed into ovens of various sizes and shapes have been introduced by Radcor, Inc.

These panels are offered in a variety of widths and heights, with the top sections hinged for inclining in an arc to form half an oven section. By placing similar units opposite one another, an oven of any size can be formed by merely rolling them into position and inclining each bank of units.

Wiegand Portable Electric Infrared Panel

Manufacturer: Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pennsylvania.

For more data circle 20 on Postpaid Card

★ ★ ★

Blackening Process for Steel

The Orthox blackening process for steel produces a hard, dry, corrosion-resistant, deep black finish. The solution operates at low temperature, rinses freely in cold water. Treated surfaces showed no rust or corrosion after 180 hours in standard humidity tests. Standard salt spray tests produced no rust on parts after 1½ hours.

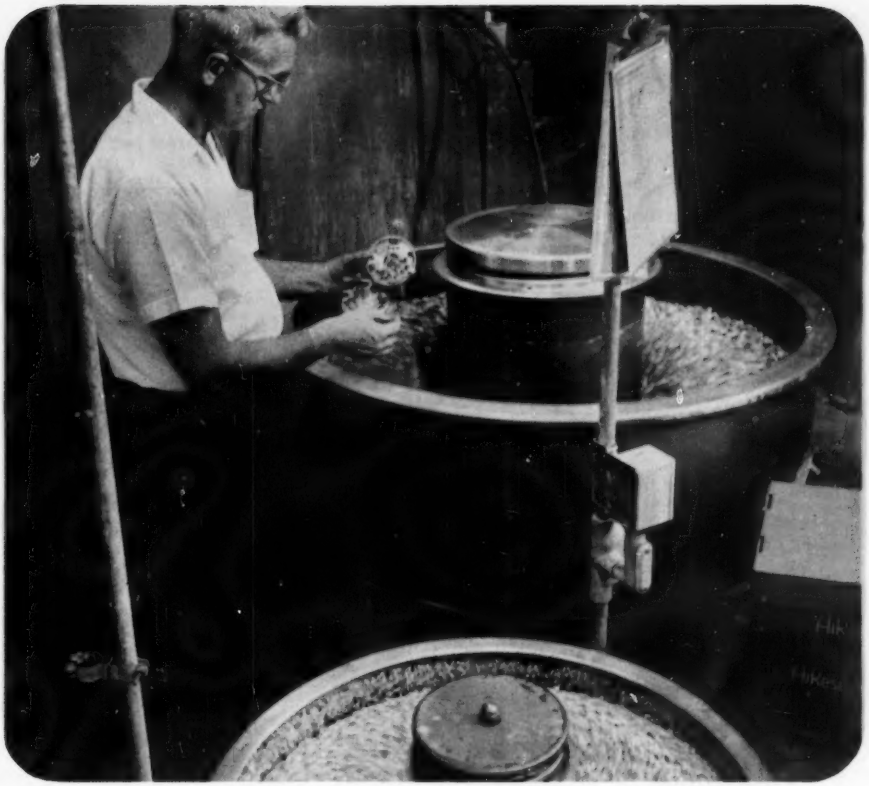
The blackening salts contain ingredients to rectify contamination in the bath. The finish exceeds Government Specifications MIL-C-13924 A.

Manufacturer: Du-Lite Chemical Corp., 12 River Rd., Middletown, Connecticut.

For more data circle 21 on Postpaid Card

U.S.
PAINTS
A Complete Line of
INDUSTRIAL FINISHES
and
FREE TECHNICAL SERVICE
U. S. PAINT CO.
HOME OFFICE & MAIN PLANT
2101 Singleton, St. Louis 3, Mo.
The Anthony Paint Division • Kansas City
The Martin Varnish Division • Chicago
Warehousing: St. Louis • Chicago • Memphis
• Decatur, Ill. • Kansas City
Sales Representation in principal cities.

For more data circle 379 on Postpaid Card



Deburring time reduced one-half at AiResearch

The SWECO *Vibro-Energy Finishing Mill* has reduced deburring time 50% at the Garrett Corporation's AiResearch Manufacturing Div., Los Angeles. Before installing the SWECO Finishing Mill it took 10 minutes to deburr one part. Now the SWECO Mill does many parts at once. ⌘ Originally AiResearch ordered two SWECO Finishing Mills. After checking results, four more were ordered. ⌘ AiResearch manufactures precision aircraft, missile and other military equipment where finishing is highly important. SWECO's Vibro-Energy principle produces a controlled, consistent product, with all surfaces, even edges and recesses, uniformly finished. The open-top design makes it easier to inspect parts without stopping the unit. Cleaning and changing of media have been simplified because unlike other mills which have to be tilted for unloading, the SWECO Finishing Mill practically unloads itself when the plug is pulled. ⌘ For full details, application data, and a laboratory test using *your* materials, write SOUTHWESTERN ENGINEERING CO., 4800 Santa Fe Ave., Los Angeles 58, Calif., Department 84427. ⌘ *Vibro-Energy* finishing mills, separators and grinding mills*

SWECO

*TM SEC

For more data circle 380 on Postpaid Card

Chemical-Resistant Work Clothing

Dynel chemical resistant work clothing and utility garments for use where resistance to acids and chemicals is important.

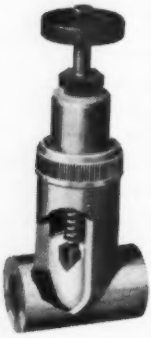
Dynel garments are said to provide from three to fifteen times the normal wear life over other types of clothing. Life is aided by the fiber's resistance to abrasion and ripping, staining and flame. Dynel is moth-proof and mildew-proof, which permits garments to be drip-dried and stored away without ironing while still damp.

Manufacturer: Travis Fabrics, Inc., Industrial Div., 1071 Avenue of the Americas, New York, N. Y.

For more data circle **22** on Postpaid Card

Corrosion-Resistant Throttlable Plastic Gate Valves

Write for CATALOG #42



- Available in: PVC, Penton, and Styrene-Copolymer
- Non-contaminating and non-galling
- Full flow and no pressure drop—like a gate valve
- Throttling control—like a globe valve
- Socket-weld—screwed and flanged ends—½" to 2" sizes—rated for 150 lbs.

VANTON
PUMP AND EQUIPMENT CORP.
DIVISION OF COOPER ALLOY CORPORATION
HILLSIDE, NEW JERSEY
VP101

For more data circle 381 on Postpaid Card

Storage Rack for Anodes

The Erecta-Shelf provides clean, compact shelving for the storage of plating anodes.

Thirteen anodes (weighing 42 pounds each) are stored per shelf, for a total of 546 pounds. The unit is light enough in weight to be assembled by one man. No nuts, bolts or special tools are required. Assembled units fasten end-to-end at right angles, back-to-back, and stack for added height.

Anode Rack: for space-saving storage

Manufacturer: Metropolitan Wire Goods Corp., N. Washington St. and George Ave., Wilkes-Barre, Pa.

For more data circle **23** on Postpaid Card

★ ★ ★

Low-Cost Cleaners

Recently introduced line of metal cleaners includes ARP No. 100 heavy-duty soak cleaner and electrocleaner; ARP No. 105, a general purpose cleaner for soak and electro-cleaning oper-

(continued)

Stevens
leadership in
metal finishing
is based on

experience!

For more than 30 years, Stevens has designed and built electroplating and processing equipment for industry around the world.

Frederic B. Stevens, Inc., has established an unchallenged lead in the design and construction of equipment for the metal plating and processing industry on a world-wide basis. Much of the present high-production efficiency of this industry is a result of Stevens engineering and research efforts.

Stevens offers a complete line of automatic metal finishing equipment designed to handle parts of all sizes . . . from tiniest electronic components to huge automotive stampings. Special equipment can also be engineered to meet individual requirements.

Stevens engineers have designed and built complete plating installations for numerous firms and have advised management on best methods and processes for maximum efficiency. This same complete Custom Design Service from Stevens is readily available to give you best results at the lowest cost.

Requests for additional information regarding machines or processes are welcomed.

Stevens designs and builds superior equipment for the following metal finishing processes:

- Electroplating
- Anodizing
- Dichromate Treating
- Stripping
- Cleaning
- Pickling
- Bright Dipping
- Phosphating
- Washing
- Other Immersion Processing

frederic b. STEVENS, inc.
DETROIT 16, MICHIGAN

Buffalo · Chicago · Detroit · Cleveland · Dayton · Wallingford (Conn.) · Indianapolis · Springfield (Ohio)

For more data circle 382 on Postpaid Card

ations; ARP No. 115, a medium alkalinity soak cleaner; ARP No. 120, a medium alkalinity high-detergency soak cleaner; ARP No. 125, a low-foaming cleaner for use in automatic power spray cleaning machines; and ARP No. 130, an alkaline de-ruster for ferrous metals.

Manufacturer: Allied Research Products, Inc., 4004 E. Monument St., Baltimore 5, Md.

For more data circle **24** on Postpaid Card

★ ★ ★

Self-Priming All-Plastic Filter Pumps

Synthetics such as Lucite, epoxies, Teflon, neoprene, Hypalon and Kel-F are utilized to provide resistance to chemicals in a series of filter pumps recently introduced by Sethco Mfg. Corp. Designated the LPNI Series, this group of filter pumps is designed for filtering extremely corrosive, expensive and sensitive liquids.

Sethco Model LPNI-30 All-Plastic Filter

Capacities in this series range up to 1200 g.p.h. Various optional accessories are available.

Manufacturer: Sethco Mfg. Corp., 2284 Babylon Turnpike, Merrick, L. I., N. Y.

For more data circle **25** on Postpaid Card

★ ★ ★

Olive Drab Finish for Cadmium

An olive drab finish on cadmium plates is produced by Kenvert No. 11-BE, a powder used in a solution of nitric acid and water at room temperature. A hard wet film is produced on cadmium plate.

The film meets requirements of color matching Federal Standard No. 595, Color 34087. The color is constant, the film has good wet strength, the solution does not fume and is stable.

Manufacturer: Conversion Chemical Corp., Rockville, Conn.

For more data circle **26** on Postpaid Card

TRUE BRITE BRASS SOLUTION

A foolproof solution which has been in use for over 6 years in light and heavy production.

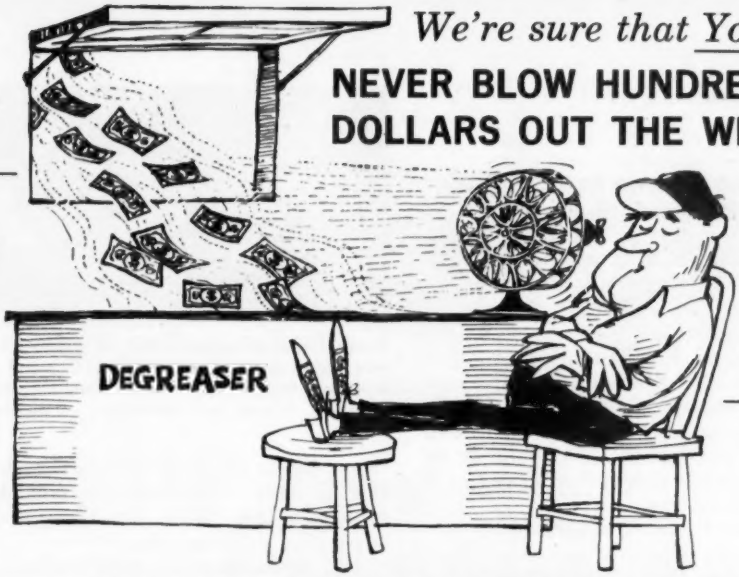
- **Ready To Use—Just Add Water**
- **No Variance in Color**
- **Trouble-Free—Little Supervision Needed**
- **Low Cost—Additions only once a day**

Available in a variety of colors. Will match your sample.

Write for technical bulletin and prices.

TRUE BRITE CHEMICAL PRODUCTS CO.
Box 31, Oakville, Conn.

For more data circle 383 on Postpaid Card



We're sure that You

NEVER BLOW HUNDREDS OF DOLLARS OUT THE WINDOW!

but...

IF YOU USE VAPOR DEGREASING— SAVE 50% OR MORE OF EVERY DOLLAR (now lost through evaporation) with the VIC VAPOR RECOVERY SYSTEM

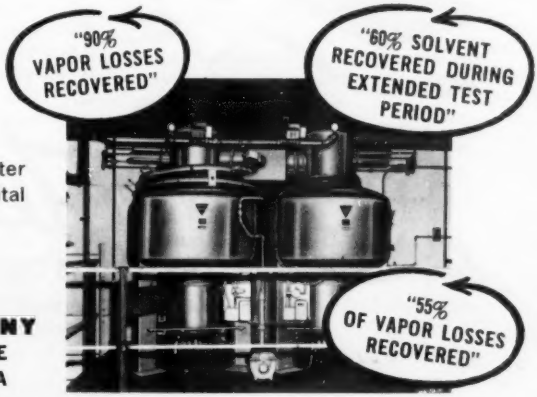
Vaporized solvent represents dollars . . . a good many dollars! Satisfied users of the Vic Vapor Recovery System report that they are saving from 50 percent to as much as 90 percent of solvent otherwise lost through evaporation. The money to be saved on your operation will look mighty good.

A Vic Vapor Recovery System can pay for itself in one year or less, by continually returning gallons upon gallons of clean, reusable solvent from vapors which usually are exhausted outside the building. Removes unpleasant vapor odors from surrounding atmosphere . . . makes working conditions more healthful, too.

There is a Vic Vapor Recovery System in a packaged size and capacity to handle practically any degreasing operation. Takes little floor space . . . or can be suspended over the degreaser. Little or no maintenance required.

TESTED AND ENDORSED BY SOLVENT MANUFACTURERS. IN USE BY LEADING FIRMS EVERYWHERE

WRITE TODAY for complete details and Meter Purchase Plan which requires no initial capital investment.



If you care—you'll compare and buy

VIC MANUFACTURING COMPANY
1301 HAWTHORNE AVENUE
MINNEAPOLIS, MINNESOTA

For more data circle 384 on Postpaid Card

Improved Silicone Release Agent Leaves Paintable Surface

A silicone parting agent with easy-release properties is compatible with paints, finish coats and adhesives.

"Fisheyes," a common malady in painting over siliconed surfaces, are not produced when painting products processed with this material.

Now commercially available, the silicone product may be obtained in two forms—Dow Corning 230 Fluid, or its water-dilutable dispersion, Dow Corning 231 Emulsion.

Results of extensive laboratory and field testing programs have established: (1) that this silicone gives clean, easy release of rubber and plastic parts; (2) that no unusual cleaning operations are required prior to painting, bonding, or coating parts released from molds or patterns coated with this silicone. The same is true for other surfaces with which the molded parts may come in contact.

Conventional silicone rubbed onto panel before painting produced fisheyes in paint at left; Dow Corning 230 Fluid rubbed on panel at right caused no difficulty in wetting.

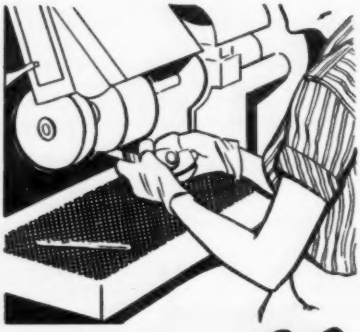
The cleaning methods normally recommended for removing oil or grease from any surface prior to painting will effectively prepare the silicone coated

(continued)

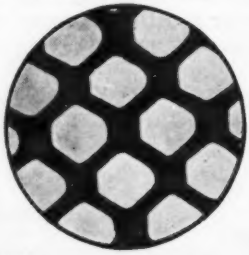
PROTECT FINE PLATED SURFACES

with **RP** *Neotex*®

PROTECTIVE MESH



Neotex . . . the open pattern Neoprene rubber matting, protects highly polished finishes when used to line any surface where goods are worked on or in transit. In roll form, Neotex can be easily cut to any size or shape . . . it's rugged and long lasting, resistant to abrasives, caustics, heat, acids, oils, oxidation. Open pattern permits buffing compounds to settle. Available in a fine or coarse pattern. Write for complete information.

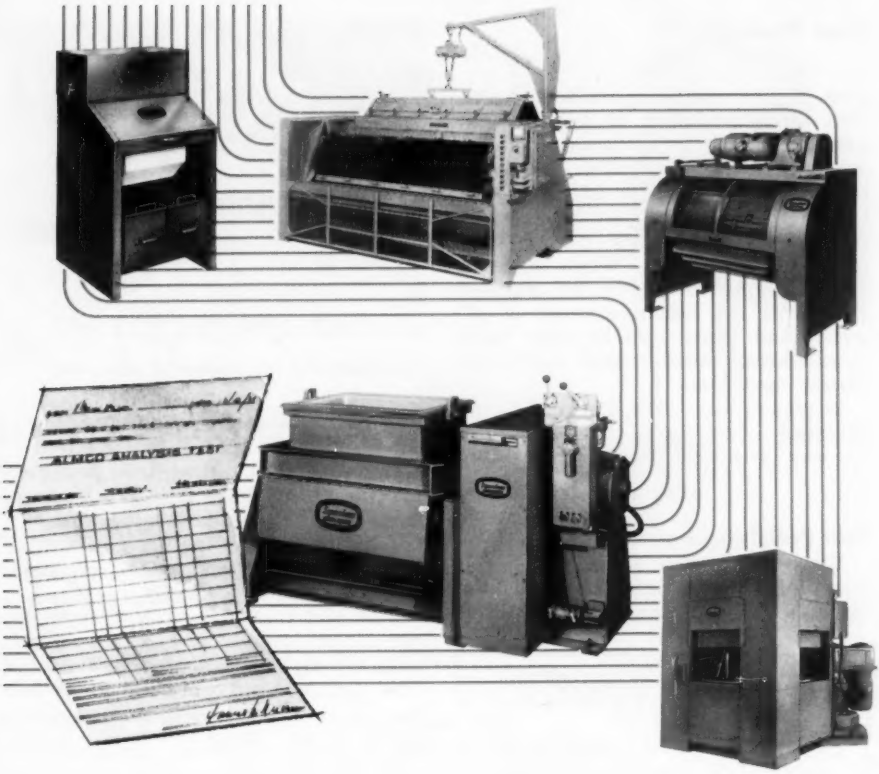


RP *Neotex*®

RESEARCH PRODUCTS CORPORATION

Dept. 76-L, Madison 1, Wis.

For more data circle 385 on Postpaid Card



Is vibratory equipment the answer?

An Almco Analysis will tell you!

Without question, vibratory equipment is the only way to finish certain types and shapes of metal parts. We know, because Almco Vibratory units are widely used throughout industry. The problem is—to know which type of finishing system is best for the particular job. And this is where an Almco Analysis will benefit you.

Almco maintains not only a complete, fully staffed laboratory in Albert Lea, but also strategically located *field* analysis centers. Here your sample parts are analyzed and run through Almco Supersheen deburring and finishing machines—processed to your specifications. And because Almco manufactures all types of deburring and finishing equipment—including horizontal, submerged, spindle, thru-feed in conventional as well as automated systems—you can be assured that you will get an unbiased report on the best and lowest cost method of doing the job.

Learn what Almco can do for you! Have your Almco representative compare your costs with the Almco Supersheen process. Write, wire or phone:

QUEEN PRODUCTS DIVISION · KING-SEELEY THERMOS CO.
Albert Lea, Minn.

BARREL AHEAD WITH **ALMCO**®

WORLD LEADER IN DEBURRING AND FINISHING SYSTEMS

For more data circle 386 on Postpaid Card

area. A few simple wipes with a solvent saturated cloth, or a rinsing in solvent or alkaline solution, or vapor degreasing are all effective in removing either 230 Fluid or 231 Emulsion to produce a surface that can be completely and uniformly coated with paints and enamels. When surfaces are so cleaned, there's no marked change in the adhesive value of cements and glues used to bond parts released from molds treated with these silicone products.

Manufacturer: Dow Corning Corp., Midland, Mich.

For more data circle **27** on Postpaid Card

★ ★ ★

Felt Polishing Bobs

Re-headable abrasive-coated felt bobs for intermediate fine polishing offer several advantages: (1) the felt under the abrasive coating absorbs shock—through its cushioning effect—eliminating chattering and gouging; (2) the points have long life because fresh abrasive heads can be applied; (3) the re-heading feature also means that surface or rim speed remains virtually constant.

Met-L-Off "Re-headable" Points Kit

The Met-L-Off kit includes eighteen pre-coated points and a supply of adhesive and abrasive for re-heading. The points need only to be rolled successively in adhesive and abrasive to be "new" again. Grits available: 120, 180, 240.

Manufacturer: Bacon Felt Co., 11 Fifth St., Taunton, Mass.

For more data circle **28** on Postpaid Card

★ ★ ★

Dumet Cleaner

Dumet Cleaner No. 206 removes the borate coating and the copper oxides formed by the fusing of the Dumet wire to glass. It will not cause undercutting or attack on the copper even after a long immersion period.

A mild product that cleans Dumet with a single immersion either at room temperature or at 110-125 deg. F., Cleaner No. 206 also may be used effectively in ultrasonic cleaners.

Safe to handle, No. 206 leaves wire clean and bright, ready for electroplating, hot tin dipping, and so on.

(continued on page 130)

FUNCTIONAL FINISHES!!

If you require your coatings to accomplish some specific task —something beyond mere ornamental appearance or average longevity—

Try Us!

We make ACRYLIC, ALKYD, CELLULOSIC and VINYLOID coatings for a very wide range of specialized industrial applications.

The Varnish Products Co.

5204 Harvard Avenue

Cleveland, Ohio

For more data circle 387 on Postpaid Card

New Model D
WINSCOTT
(The Original In-Tank)
FILTER

for $195.00 and no extras

Superior Characteristics and Operating Dependability at Lowest Cost

NEW Temperature Tolerances . . . well above operating limits of all plating baths (160° +)

NEW Corrosion Resistance . . . withstands all acid and alkaline type baths including high chloride nickel baths

NEW Higher Flow Rates . . . up to 360 gal./hr. with clean baths

NEW Cartridge Filtration . . . for easier, faster economical changes where extremely minute particle size is not critical. (Other Winscott models employ filter bags with or without filtering media.)

NEW Shallow Solution Levels . . . for precious metals. As low as 3 inches now possible with bottom intake design. Keeps sludge out of tanks.

Compare Features and You'll Choose WINSCOTT — First and Still Best In-Tank Filter Available

Fully Enclosed, Continuous Duty, Induction Type Motor is *STANDARD* on the *WINSCOTT*. No brushes to wear out and drop contaminating particles into the tank. No need to shut down the filter as with intermittent types. Efficient 3450 r.p.m. speed operates quietly without irritating whine of higher speed motors. Powerful ⅓ h.p. capacity of the Winscott guarantees against overloading at maximum flow rates.

Write for details and name of your nearest distributor.

The Chemical Corporation

83 Waltham Avenue, Springfield 9, Mass.

For more data circle 388 on Postpaid Card

Let Me Tell YOU!!!

SOLVENTOL'S #3067
Really Works

It is the answer to your barrel cleaning problems—

- Surface protection for soft metals
- Controlled emulsification for a variety of soils
- Produces a desired foam level
- Economical? Yes—and longer bath life!
- A low cost cleaner for a high quality finish

Thoroughly tested in the field for over 12 months under numerous job shop conditions.

Now it's ready for you.

Call or write for more information.

Solventol **CHEMICAL PRODUCTS, INC.**

NEW HORIZONS IN DETERGENT CHEMISTRY

15841 Second Blvd.
Detroit 3, Michigan
TO 8-8466

For more data circle 389 on Postpaid Card

NEW 100% AIR-POWERED Centrifugal Enamelers

MODEL 800-J

For applying . . .

ENAMELS
LACQUERS
LIQUID WAXES
RUST INHIBITORS
LUBRICANTS
AND OTHER COATINGS.

Check these features . . .

SAFE — operates entirely by air — no electricity; complies with safety codes.

HIGH OUTPUT — up to 3000 lbs. or 40 cu. ft. of coated parts per hour.

CLEAN — no outside dipping — no wasted paint.

COMPACT — supply tank beneath machine.

VERSATILE — variable speed from 0 to 600 R.P.M. complete control of film thickness. Coat fragile parts at lower speeds. Color change-over in 5 minutes.

Write today for Bulletin #800-J . . . it will give you full details on the convenience, design features and economy of the Barrett Air-Powered Centrifugal Enamelers.

THE LEON J. BARRETT COMPANY
1449 GRAFTON ROAD, WORCESTER 1, MASSACHUSETTS, U.S.A.

For more data circle 390 on Postpaid Card

Dumet is extensively used in the manufacture of diodes, tubes, transistors and other glass-to-metal seals.

Manufacturer: Fidelity Chemical Products Corp., 470 Frelinghuysen Ave., Newark 14, N. J.

For more data circle **29** on Postpaid Card

★ ★ ★

Air-Powered Transfer Pump

An air-powered transfer pump eliminates hand pumping of fluids from drums to other containers or points of use. Pumps up to seven gallons a minute, free-flow, handles fluids as heavy as 90-weight gear oil.

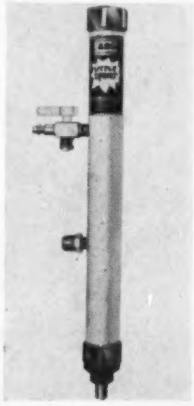
The "Little Squirt" will transfer almost any kind of non-corrosive fluid, including kerosene, gasoline, thinners.

Delivery is instantly adjustable from zero to full flow. No hazard from explosion or sparks, since the unit is completely air powered. It requires as little as 15 p.s.i. air pressure, will operate on standard line pressures up to 150 p.s.i.

A universal bung mount allows fitting to either standard ¾-inch bung inlet, 1¼-inch inlet, and with adapter, 2-inch inlet. The pump can be adapted to any size or shape of open container from a hand pail to a deep tank.

Manufacturer: The Aro Corp., Industrial Div., Bryan, Ohio.

For more data circle **30** on Postpaid Card



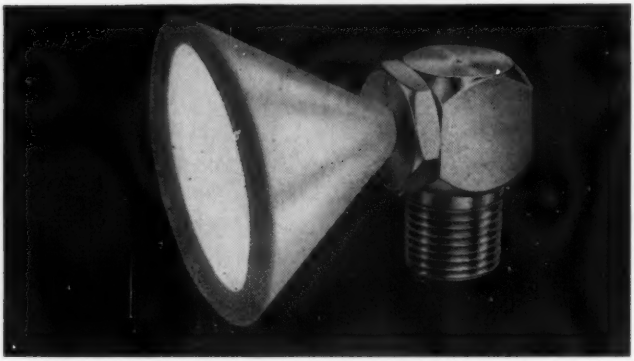
Aro "Little Squirt"

METAL FINISHING NOZZLE PROBLEM

To select a nozzle which will efficiently spray phosphate coatings to metal surfaces.

SOLUTION

Delavan Type 2172 WR nozzle



This outstanding nozzle can operate effectively at pressures as low as 5 psi. Made of 316 stainless steel, the 2172 WR offers high resistance to corrosion, assuring longer, more dependable service. There are no vanes, cores or other obstructions to promote clogging.

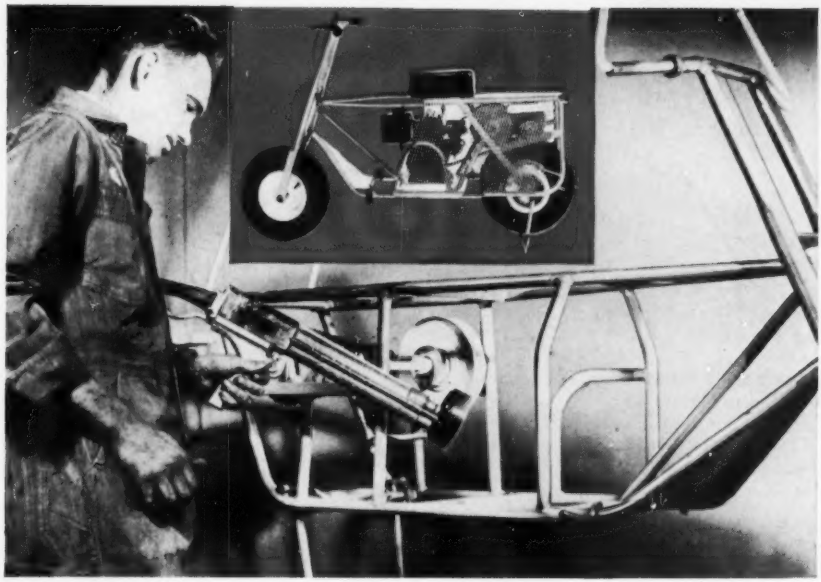
Whatever metal finishing nozzles you require, there's a Delavan nozzle that does the job best. Write today for Catalog 33A.

DELAVAN Manufacturing Company

WORLD'S LARGEST MANUFACTURER OF NOZZLES • WEST DES MOINES • IOWA

Canadian Representative— ONTOR LTD., 12 Leswyn Road, Toronto 19, Ontario, Canada

For more data circle 391 on Postpaid Card



RANSBURG Hand Gun Cuts Paint Costs 35%— Painting Time 25% Over Former Flo-Coat in the Production of TOTE GOTE Cycles

Continually searching for better and faster manufacturing methods, the Bonham Corporation, Provo, Utah, switched from flo-coating to Ransburg Electrostatic hand spray to paint their Tote Gotes. The Tote Gote is an "off-highway" cycle, especially popular with hunters and fishermen who use it to travel over rough and rugged terrain not readily accessible by highways and roads.

Now, with electrostatic spray painting, Bonham is getting an improved uniform coating—a 35% savings in paint cost—painting time is cut 25%. And this over flo-coat!

RANSBURG

The predominately tubular construction of the Tote Gote makes it particularly adaptable for painting with the Ransburg No. 2 Process Hand Gun. That's because the "wrap-around" feature of electrostatic painting covers all such areas from one side only.

NO REASON WHY YOU CAN'T DO IT TOO

See how the Ransburg Electrostatic Hand Gun can save time . . . paint . . . and cut costs in YOUR finishing department. Or, if your production justifies, it will pay you to investigate Ransburg's automatic electrostatic spray painting equipment. Send for our No. 2 Process brochure which cites numerous examples of modern production painting in both large and small plants.

RANSBURG Electro-Coating Corp.

Box 23122, Indianapolis 23, Indiana

Affiliates in AUSTRALIA • AUSTRIA • BELGIUM • BRAZIL • DENMARK • ENGLAND • FRANCE • FINLAND GERMANY • HOLLAND • INDIA • IRELAND • ITALY • NEW ZEALAND • NORWAY • PAKISTAN • SOUTH AFRICA • SPAIN • SWEDEN and SWITZERLAND

For more data circle 392 on Postpaid Card

4 good reasons why you should use IRIDITE Chromate Conversion Coatings FOR FINISHING ZINC OR CADMIUM

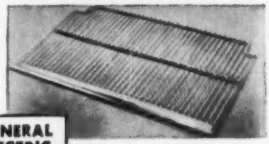
CORROSION PROTECTION—The wide range of Iridite coatings available gives you a choice of corrosion protection—from economical, mild protection of parts for shipment, storage or display, to extremely high protection under exposure to marine and highly humid atmospheres, gasoline or other hydrocarbons.

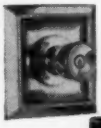
PAINT BASE—For an extremely tight bond for either baked or air-dried paints, non-porous Iridite blocks moisture penetration—prevents formation of metallic soap products beneath paint coatings.

APPEARANCE—Your choice of colors ranging from clear through yellow iridescent to olive drab. Bright Iridite finishes can also be dyed to provide other color effects.

SPECIAL EFFECTS—Iridite, in combination with other Allied Research processes, can provide a wide variety of finishes. As an example, Iridite 8-P applied to zinc or cadmium, followed by an application of Irilac, gives a highly attractive simulated brass finish.

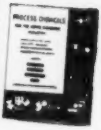
IRIDITE—a specialized line of chromate conversion coatings for nonferrous metals. Easily applied at room temperatures with short immersion times, manually or with automatic equipment. Forms a thin film which becomes an integral part of the metal. Cannot chip, flake or peel. Special equipment, exhaust systems or highly trained personnel not required.





Medalist
NATIONAL LOCK COMPANY

For complete information on Iridite, contact your Allied Field Engineer. He's listed in the yellow pages under "Plating Supplies." Write for FREE TECHNICAL DATA FILES.



Allied Research Products, Inc.

4004-06 EAST MONUMENT STREET • BALTIMORE 5, MARYLAND
BRANCH PLANT: 400 MIDLAND AVENUE • DETROIT 3, MICHIGAN
West Coast Licensee for Process Chemicals: L. H. Butcher Co.
European Agent: Stora Gronberger, Storgatan 10, Stockholm, Sweden
Chemical and Electrochemical Processes, Anodes, Rectifiers, Equipment and Supplies for Metal Finishing

IRIDITE® Chromates | IRILAC® Coatings | ISOBRITE® Brighteners | ARP® Supplies | WAGNER Equipment

For more data circle 393 on Postpaid Card

Looking For Savings? Then Read . . .

Lockheed F-104A Starfighter with aluminum surfaces protected by Iridite 14-2.

How IRIDITE® Helps Lockheed Cut Aluminum Finishing Costs

Nine years ago, Lockheed switched from anodizing to Iridite chromate conversion coatings. That year, they saved over $40,000 in materials and manpower.

Today, Lockheed is still saving money with Iridite 14-2. Here's how:

Process time is reduced from 45 minutes to a maximum of only 5 minutes. Three times as much work is processed in a single run. Easy-to-load baskets, replacing costly anodizing racks, save $15,000 per year. Expensive electrical equipment is eliminated because Iridite is a simple chemical dip.

Moreover, Iridite 14-2 gives improved corrosion resistance, easily meeting MIL-C-5541, and provides excellent paint adhesion.

More than likely, Iridite can save you money and give you better finishing results than your present method. Discuss it with your Allied Field Representative. Or, write for literature.

Allied Research Products, Inc. 4004-06 EAST MONUMENT STREET • BALTIMORE 5, MARYLAND
BRANCH PLANT: 400 MIDLAND AVENUE • DETROIT 3, MICHIGAN
West Coast Licensee for Process Chemicals: I. H. Butcher Co. • European Agent: Stora Gronberger, Storgatan 10, Stockholm, Sweden

Chemical and Electrochemical Processes, Anodes, Rectifiers, Equipment and Supplies for Metal Finishing

IRIDITE® Chromates | IRILAC® Coatings | ISOBRITE® Brighteners | ARP® Supplies | WAGNER Equipment

For more data circle 394 on Postpaid Card

FREE LITERATURE

40. Portable Deburring Machine
Leaflet describes and illustrates Almco Model DBM-10 portable deburring and finishing unit. Removable barrel is driven by neoprene rollers. Almco, Queen Products Div., King-Seeley Corp.

41. How Urethane Coatings Stop Corrosion
Brochure tells why urethane coatings are superior in providing resistance to chemicals, abrasion, weather. Chemical reactions involved are explained. Table lists resistance to 55 chemicals. Application recommendations. Better Finishes & Coatings, Inc.

42. Chromate Coating
Data sheet on Luster-On Utility-K, a chromate conversion coating for zinc or cadmium plated surfaces. Includes information on operating conditions, bath make-up, hints for improving results. The Chemical Corporation.

43. Pyrex Drain Line
A 16-page catalog on Pyrex "double-tough" drain line for disposal of chemical wastes. Data on properties, advantages, fittings. Bulletin PE-30. Corning Glass Works.

44. Tank Rod Insulators, Agitator Rollers
Data sheet shows tank rod insulators and agitator rollers which clamp on the rim of the tank. Daniels Plating Barrel and Supply Co.

45. Invert Emulsion Cleaner
Enthol V-240 removes heavy buffing compound deposits. At operating temperatures it is a water-in-oil emulsion, thus soil is removed by practically pure solvent. As temperature drops, emulsion reverts to standard oil-in-water form, facilitating rinsing. Enthone, Inc.

46. Silver Stripper
An acid solution for removing silver deposits from copper, brass and other copper alloys is described in Technical Data Sheet No. 127. MacDermid, Inc.

47. Dip Tank Viscosity Control
Bulletin V-1226 describes Norcross solvent control for adding solvent to paint dip tanks as necessary to compensate for solvent evaporation. Adds solvent automatically as evaporation occurs. Norcross Corporation.

48. Gas-Fired Infrared Burners
A 4-page folder on gas-fired infrared heaters that assemble into large banks of radiant panels without manifolding. Pyronics, Inc.

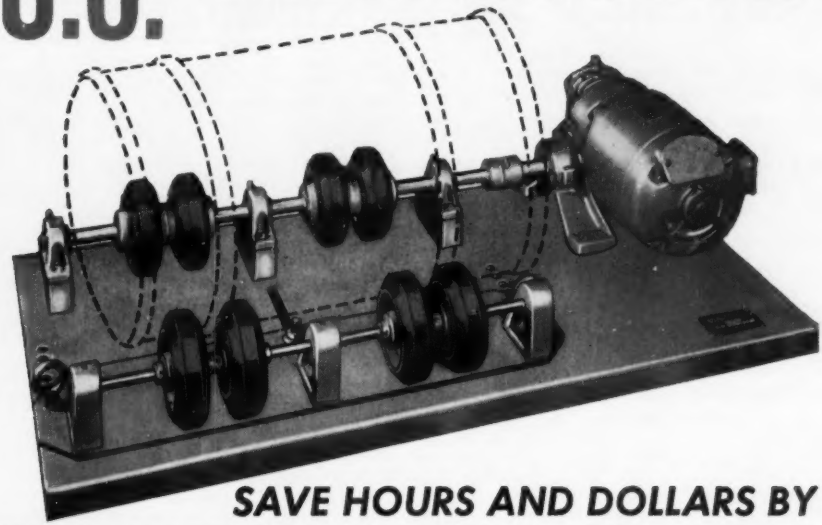
49. Precision Barrel Finishing Machines
Catalog 9A: comprehensive data on a complete line of barrel finishing equipment and accessories. Rampe Manufacturing Co.

50. Electrostatic Generator
An 8-page brochure describes electrostatic generators used in electrostatic precipitation and for other uses. Features, applications, principles of operation. SAMES-USA.

51. Plating Brighteners
Series of four technical booklets on brighteners for nickel, zinc and cadmium. Includes operating data and instructions, consumption figures, special notes on features of the processes. Sel-Rex Corporation.

52. Chromic Acid
Folder Mut-4 describes desirable features of mutual chromic acid for plating. Solvay Process Div., Allied Chemical Corporation.

"U.S." DRUM ROLLERS



SAVE HOURS AND DOLLARS BY MIXING MATERIALS IN THE SUPPLIER'S DRUMS

Not only do you save valuable time by *not* transferring materials from one container to another, but even more important, you eliminate the chance of contamination. "U.S." Drum Rollers handle *any* round container from a 5-gallon pail to a 55-gallon drum. Bungs, bands or flanges make no difference . . . rollers adjust to the type of container.

Electrically conductive Neoprene wheels on ball bearings provide *smooth* rolling. All-welded extra-heavy steel bases assure rigidity, long, trouble-free life. Constant speed, or variable speed drives, plus a range of sizes, meet your capacity requirements. Explosion-proof and air-driven motors for use in volatile atmospheres are optionally available. WRITE TODAY for Bulletin DM-290 containing details on the full line of "U.S." Drum Rollers.

Process Equipment Division

U. S. STONEWARE

407-G

AKRON 9, OHIO

For more data circle 395 on Postpaid Card

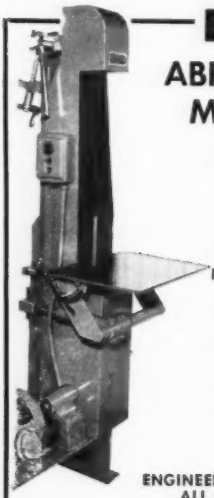
53. Brass Stripper
Data sheet on Tivian B-Strip, a cold immersion stripper for removing brass deposits from steel. Tivian Laboratories.

54. Rectifiers
Twelve pages on Ultrasil rectifiers. Photos, charts, tables, detailed information on control elements, diode assembly, rheostats, switches, transformers. Udylite Corporation.

55. Vapor Recovery Systems for Degreasers
A 4-page folder on Vic vapor recovery systems for solvent degreasers. Said to cut solvent losses by 50 per cent and improve working conditions. Vic Manufacturing Co.

56. Cleaning Products for Plating Lines
A 6-page folder (F-2810) discusses electrocleaning, spray cleaning, soak cleaning, buffing-compound removal, removal of rust from precision parts. J. B. Ford Div., Wyandotte Chemicals Corp.

57. Semi-Automatic Polishing and Buffing Machines
20 pages on semi-automatic machines for low-production deburring, buffing and polishing operations. Acme Manufacturing Co.



BUSH

ABRASIVE BELT MACHINERY

INTERNAL TUBE AND ROCKET BELT GRINDERS
SHELL MOLD BELT GRINDERS
YOKE SANDERS
SWING SANDERS
TABLE TONGUE SANDERS
PEDESTAL BELT GRINDERS
BAND SANDERS
ABRASIVE BELT GLASS GRINDERS (SINGLE, DOUBLE, TRIPLE BELT CAPACITIES)
SUPPLEMENTAL BELT GRINDER HEADS
CONTACT WHEELS — AIR PLATENS — ACCESSORIES

ENGINEERING AND DESIGN FOR ALL SPECIAL APPLICATIONS

WRITE FOR BROCHURES

BUSH MANUFACTURING CO.
CLAWSON, MICHIGAN

For more data circle 396 on Postpaid Card

58. Centrifugal Galvanizers
A six-page bulletin describes the 402-G galvanizer with an automatic cycle which closes the lid, spins the work, stops rotation and opens the lid; the 152-G galvanizer, for limited production; and the 402-G galvanizer for high production. Importance of direct drive used on these machines is explained. The Leon J. Barrett Co.

59. Air-Dry Lacquer
Champion air-dry No. 2 clear lacquer for gold, brass, copper and bronze. Uniform finish, no seeding problems. Agate Lacquer Mfg. Co., Inc.

60. Cold Stripper
Technical sheets describe Electro Cold Stripper, a non-flammable liquid paint remover that will strip air-dry and high-bake synthetic coatings, alkyds, epoxies, vinyls, phenolics and so on. This product is useful in removing specialized coatings such as photo resists, vacuum plated coatings, and is also used in conjunction with ultrasonic cleaning operations. Available in liquid form for dipping operations or in viscous form for brush application or flow on. Allied Finishing Specialties Co.

61. Powdered Chromates
Information on several powders which dissolve in water to make chromate coating solutions. Easier control, slightly different properties than liquid counterparts. Allied Research Products, Inc.

62. Copper Coatings
Bulletin 1448. Amchem Cuprodine for producing bright, adherent copper coatings on carbon and stainless steels. Amchem Products, Inc.

63. Curved Anodes
Information on "Plus-4" phosphorized copper anodes which are curved so as to be parallel to rotogravure cylinders being plated. Anaconda American Brass Company.

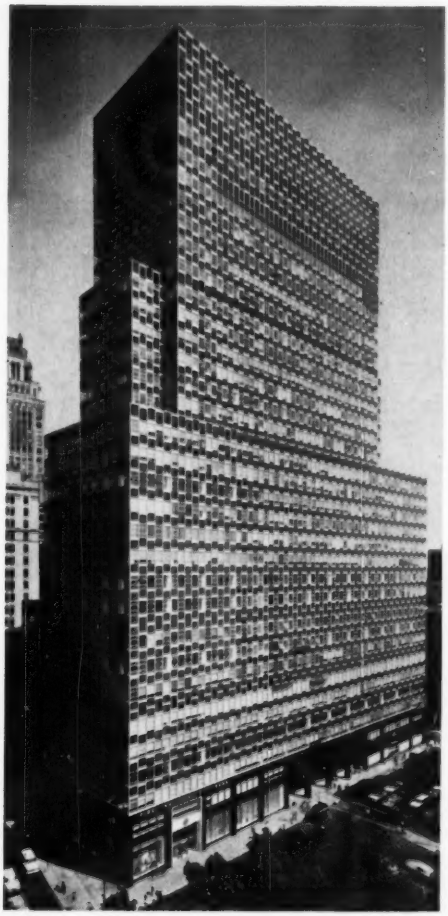
64. Solvents and Thinners
Information on solvents and thinners for product finishing: troluoil, Dryolene, Apcothinner, No. 10 Mineral Spirits. Apco Oil Corp.

65. Degreaser Lid
Information on the Baron Econ-O-Lid, a roll-type cover which fits all vapor degreasers, is easy to roll open or shut. Baron Industries.

66. Improved Polishing
Booklet entitled "Better Offhand Polishing." Behr-Manning Co.

67. Plating Barrels
Complete catalog describes plating barrels of various sizes and types. Belke Manufacturing Co.

Cosden Clear Acrylic Keeps Lupton Aluminum Windows Bright & Stain-Free



Lupton aluminum windows are chosen for many major buildings from schools to skyscrapers because of their beauty and durability. To protect these handsome windows from abrasion and staining by mortar, plaster or concrete etching acid, their maker, Michael Flynn Manufacturing Company dip-coats them in a Cosden clear acrylic lacquer. The result is a hard, clear coating with excellent adhesion and outdoor durability. The lacquer is formulated specifically for the dip-coating process to assure a drip-free uniform coating.

Where required, Cosden acrylics —either clear or pigmented—can be adapted with equal success to other application methods.

Are they the answer to your finishing problem? Send us the details and we will give you a prompt, honest answer.

PHOTO BY WURTS BROTHERS

COSDEN PAINT COMPANY BEVERLY NEW JERSEY

For more data circle 397 on Postpaid Card

68. Equipment for "Tri-Finish" Process
A six-page folder details the process, equipment and cost of trichlorethylene-based cleaning-phosphatizing-painting system. Excellent drawing and clear descriptions of this integrated, compact painting system. It cleans, phosphatizes and paints metal parts in a single enclosure. G. S. Blakeslee & Co.

69. Tack Cloth
Literature on treated cloths that pick up dust and lint prior to paint finishing. Bond Chemical Products Co.

70. Ultrasonics in Action
Bulletin S-200 is a 24-page booklet on the basic principles, design and practical applications of ultrasonic cleaning equipment. Branson Instruments, Inc.

71. Metal-Processing Products
A six-page folder describes the products made by Bruce Products Corporation: buffing compounds, drawing compounds, cutting oils, non-rust oils, spray booth coatings, cleaners, polishing wheels, die-cut release agents. Bruce Products Corp.

72. Abrasive Belt Finishing Machinery
Information on Bush Model M-200 Yoke Sander. Bush Mfg. Co.

73. Printed Circuit Drafting Aids
A six-page table illustrates all of the precut pressure sensitive tapes in narrow widths and special shapes for making pasted-up printed circuit drawings that will conform to military specifications. Free samples of overlapping donut terminal pads included. By-Buk Co.

74. Colors for Anodizing
Information on dyestuffs for coloring anodized aluminum. Jet blacks, many colors. Light fast. Rarely require buffering for pH adjustment. Carbic-Hoechst Corporation.

75. Buffs
Information on the Churchill *501 Finger Buff, a standard buff that smooths most parts without excessive wear on the face. Runs cooler, wears uniformly, cuts well. Geo. R. Churchill Co., Inc.

76. Cleaning and Finishing Machinery
A two-page bulletin describes machines, systems and processes for cleaning and finishing metal products. Cincinnati Cleaning & Finishing Machinery Co.

77. Anodizing Racks
Information on Continental Ti-Core racks, which have splines of aluminum for better electrical conductivity, clad with titanium for resistance to corrosive anodizing solutions. Continental Rack Company, Inc.

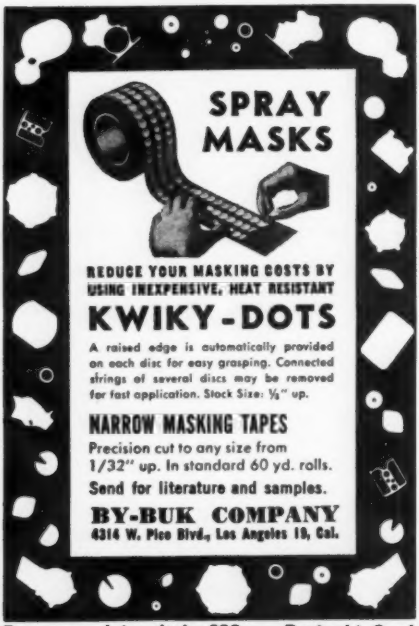
78. Roller Coating Finishes
Data on vinyl coatings and enamels for roller-coat application. Cosden Paint Co.

79. Buffing-Compound Remover
A four-page folder describes advantages of Buff-Off, a product that is said to significantly improve the ease with which buffing compound is removed from zinc die castings prior to plating. Cowles Chemical Co.

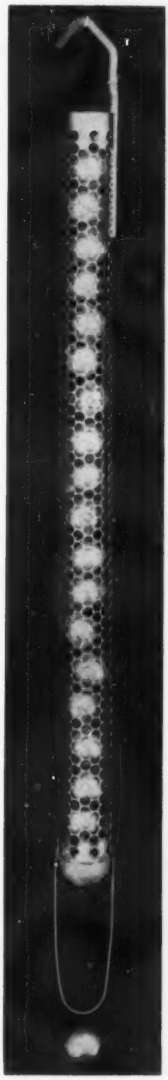
80. Spray Nozzles
Catalog No. 33-A is designed to help the user select the proper type of spray nozzle for a particular application. Complete data on each type of nozzle, including photo, construction details, capacity, recommended uses, spray characteristics, materials available. Delavan Mfg. Co.

81. Paint Pumps
Catalog I-3101-A describes and illustrates paint pumps that pump from the original container; deliver with uniform flow and pressure; supply numerous guns with capacity for fast production. The DeVilbiss Company.

82. Safer Cleaning for Sensitive Metals
Information on Chlorothene NU, a cold-degreasing solvent that can be used safely on all common metals, including white metals. Non-flammable, easily recovered by distillation. Dow Chemical Company.


SPRAY MASKS
REDUCE YOUR MASKING COSTS BY USING INEXPENSIVE, HEAT RESISTANT
KWIKY-DOTS
A raised edge is automatically provided on each disc for easy grasping. Connected strings of several discs may be removed for fast application. Stock Size: ⅛" up.
NARROW MASKING TAPES
Precision cut to any size from 1/32" up. In standard 60 yd. rolls.
Send for literature and samples.
BY-BUK COMPANY
4314 W. Pico Blvd., Los Angeles 19, Cal.
For more data circle 398 on Postpaid Card

NEST OF NICKEL BALLS GIVES NEW METHOD IN NICKEL PLATING BY UNIVERTICAL



BALL NICKEL ANODES IN TITANIUM BALL ANODE CONTAINERS . . .

provide positive improved control of uniform plate thickness through controlled constant anode area . . . With these additional benefits:

- **Thirty per cent more anode area exposed with one-half the weight of nickel required.**
- **Eliminates scrap generation and costly scrap remelt charges and shrinkages.**
- **Eliminates floating bags, especially in air agitated baths—and cutting of bags caused by anode spears.**
- **Carbon sludge drops in a special pouch provided at the bottom of the container through bail device, allowing longer plating production time between shutdowns.**
- **Eliminates the need of blind checking nickel bar anodes for required anode area.**
- **Eliminates polarization.**
- **Eliminates nickel salt additions through constant anode area.**

UNIVERTICAL CORPORATION

14841 MEYERS RD. • DETROIT 27, MICH. • BR 3-2000

Producers of Rolled, Cast and Forged Anodes, since 1939

For more data circle 399 on Postpaid Card

83. Paint Stripper
Information on DuStrypp, a rapid-acting paint remover that has no disagreeable odors, contains harmless ingredients that are easy to dispose of without harm to sewage and sanitation lines. High soil capacity. DuBois Chemicals, Inc.

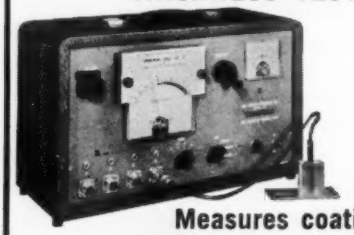
84. Copper Plating Chemicals
Literature describes "Coppralyte" Copper Plating Chemicals. E. I. du Pont de Nemours & Co. (Inc.).

85. Electropolishing
Information on electropolishing solutions for aluminum, copper, stainless steel, other metals and alloys. Electro-Glo Co.

86. Silver Anodes
Information on silver anodes produced by the AP & S extrusion process to produce controlled grain size so that corrosion is smooth. Available in "Dog-Bone," "Rectangular," and "Tear Drop" shapes. American Platinum & Silver Div., Engelhard Industries, Inc.

87. Butadiene-Styrene Resins
A 20-page booklet tells what Buton resins are, describes their uses for appliance finishes, automotive primers, can coatings, flat steel primers, other applications. Includes discussion of physical properties, performance qualities, and so on. Enjay Chemical Co.

The Latest
DERMITRON
NON-DESTRUCTIVE THICKNESS TESTER!



Measures coatings rapidly and accurately.

Instantly measures the thickness of metallic and non-metallic coatings and films.

Write for complete information.

UNIT PROCESS ASSEMBLIES, INC. UPA
53-15 37th Ave., Woodside 77, N.Y.

For more data circle 400 on Postpaid Card

88. Rigid Air Hoist
Information on advantages of Solbern rigid air hoist for use in lifting and transporting racks of parts in plating and anodizing plants. Factory Installations Corp.

89. Bright Nickel
Information on Levelmax, a bright nickel plate that reduces buffing, makes chromium plating easier. Federated Metals Div., ASARCO.

90. Tumbling Media File
Includes information on new HC-10 (Honing) media for producing low microinch finishes on aluminum parts. Also outlines other standard media shapes, sizes and bonds. Fortune Industries, Inc.

91. Finishing Systems
Twelve pages of information on the company's finishing systems and components for finishing systems. Includes information on ovens, furnaces, air-supply systems, special mechanical handling systems, spray booths, dust collectors. Granco, Inc.

92. Dust Collectors
Catalog No. DK-820 describes practical, effective ways of solving dust, dirt and mist-collecting problems. A 16-page catalog. Contains explanations of how to achieve maximum results with various models in the line of Hammond Dus-Kolectors. Installation recommendations, specifications, etc. Hammond Machinery Builders, Inc.

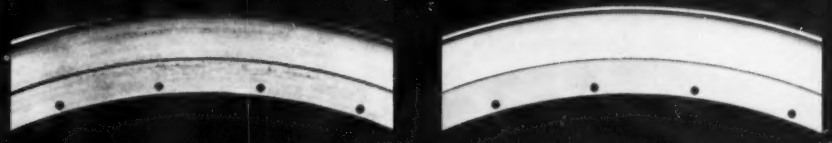
93. Anodes and Plating Chemicals
Bulletin AC-112, eight pages on anodes, anode accessories and chemicals for electroplating. Specifications and recommended applications are given for several styles of anode bags and seven types of anodes. Salts and brighteners used in electroplating baths are listed. Drawings show how to order hooks for round, flat and shaped lead anodes. Hanson-Van Winkle-Munning Co.

94. Automatic Polishing Equipment
Information on automatic polishing and buffing machines. Harper Buffing Machine Co.

95. Copper-Nickel-Chromium and Corrosion Protection
Reprint of a technical paper. Eight pages. Discusses such questions as "Is a copper undercoat prior to nickel of any value?"; "Are results obtained at one outdoor exposure site representative of those obtained at other sites?"; "Are plated parts, especially on cars, giving as good service as they did in the past?"; and others. The Harshaw Chemical Company.

Use them with any blast equipment...

GLAS-SHOT® CLEANS METAL LIKE CRAZY



Titanium jet engine spacer before cleaning

Glas-shot produces bright, clean surface

If your operation involves metal cleaning, we firmly believe you'll be impressed with the results you can achieve with Glas-shot.

Glas-shot is special microscopic glass beads for use with all types of wet or dry blast equipment. Glas-shot can produce a metallurgically pure surface on any metal . . . faster . . . regardless of the foreign matter or contaminants requiring removal. Uniformly spherical in shape, it removes no base metal, leaves no imbedment . . . is equally effective in treating both internal and external surfaces.

The capabilities of Glas-shot are almost inexhaustible, ranging far beyond cleaning, alone. Samples and the new brochure, "The Story of Glas-shot", are yours for the asking. Drop a request in the mail today.

Microscopic Glass Beads for Industrial and Reflective Purposes

MICROBEADS, INC.

P.O. BOX 241 • JACKSON, MISSISSIPPI

Canadian Licensee:

CATAPHOTE/CANADA LTD.

P.O. Box 727, Brantford, Ontario

BL-160

For more data circle 401 on Postpaid Card

Circle numbers on postpaid card opposite page 128 to obtain free literature

96. Metal-Treatment Materials
New folder describes company's line of black oxide finishes, chromate coatings, cleaners, oils and strippers. Heatbath Corporation.

97. Bright Dip for Zinc
Rodip ZN-30 is a powdered material that dissolves in cold water and operates at room temperature to brighten and passivate zinc plate. Chemically polishes surface, improves resistance to tarnish and corrosion, provides adhesion for lacquer. R. O. Hull & Co., Inc.

98. Tack Rags
Literature on Ideal Tack Rags, specially treated cloths that pick up dust and other particles just prior to application of an organic finish. Ideal Chemical Co.

99. Waste-Treatment Aid
Bulletin describes IFA-313, a coagulating aid used to assist in the coagulation and settling of metal finishing wastes. Illinois Water Treatment Co.

100. Zinc Phosphate Coating
Four-page folder on Meta Bond, a zinc phosphate for protecting metal products prior to painting. Includes data on crystalline structure, degree of protection afforded by this system in comparison to other conversion coatings. International Rustproof Company.

101. Barrel Copper Brightener
Information on a brightener designed for high-speed bright copper plating right out of the barrel. Excellent throwing power, eliminates cyanide fumes. Jelco Finishing Equipment Corp.

102. Fume Control System
Booklet F shows typical installations of Kirk & Blum fume-control systems. Kirk & Blum Mfg. Co.

103. Flow Coating System
Information on flow-coating systems incorporating the Zahn Oscicator, a device that makes possible flow coat painting with 70 to 90 per cent fewer nozzles, less solvent loss, smaller pumps and tanks, shorter tunnels. George Koch Sons, Inc.

104. Heat-Processing Equipment
A series of descriptive sheets illustrate and describe equipment for drying, baking, other processes requiring heat. Various types and sizes of ovens and furnaces described and illustrated. The Lanly Co.

105. Rust Preventive
Data sheet on Magnafilm 230, an emulsifiable rust preventive which not only furnishes excellent indoor protection, but eliminates fire hazard associated with solvent-type materials. Magnus Chemical Co., Inc.

106. Space-Saving Dip-Finishing System
Data on a dip finishing machine in which the tank raises to immerse parts hanging from a conveyor. It saves space since a smaller tank can be used when space need not be provided for gradual work withdrawal. R. C. Mahon Co.

107. Plating Course
Information on a correspondence course in electroplating. Joseph B. Kushner Electroplating School.

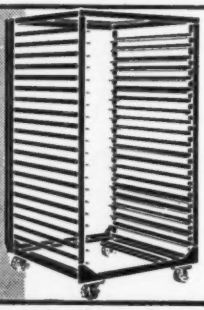
108. Glass Shot
Information on Microbeads Glas-Shot, microscopic glass beads for use in wet and dry blasting equipment for cleaning, polishing, peening and finishing. Microbeads, Inc.

109. Silicone-Base Finishes
Brochure describes Sicon, a silicone-based, heat-resistant paint used in high-temperature applications. Includes general information, data on properties, characteristics, applications. Midland Industrial Finishes Co.

110. Pearlescent Finishes
A 4-page brochure tells about Murano colors, pearlescent finishes in beautiful colors produced by optical effect. Mearl Corporation.

111. Plating Rack
Data sheet describes and illustrates 40-part plastisol-coated utility rack. Mitchell-Bate Co.

FOR INCREASED PRODUCTION
and
GREATER OVEN CAPACITY
use WILDER
RACK TRUCKS
No. 660



27 Standard Style and 150 Standard Size platform, shelf, tray, rack, stake, bin, box and table trucks to select from. Special sizes can be furnished.

Write for Complete Information on Wilder's Full Line of Production Handling Equipment.

WILDER
MFG. CO., INC.
Port Jervis, New York

For more data circle 402 on Postpaid Card

112. Drum-Handling Tools
Literature on a line of drum-handling tools and equipment: drum wrenches, drum upenders, carts and so on. Morse Mfg. Co., Inc.

113. Economy-Model Lathe
Literature on a new economy lathe that has all the essential features without costly "frills." Murray-Way Corporation.

114. Orbital Sander
Catalog describes and illustrates the Mity-Midget, an orbital sander that weighs only four pounds, yet cannot be stalled even by standing on it. National-Detroit, Inc.

115. Water-Dip Lacquer
Information on Nikolas water dip lacquers. Protect silver, brass and copper from tarnish. Wet parts coming from last water rinse immediately go into the water-dip lacquer. G. J. Nikolas & Co., Incorporated.

116. Airless Spray
Two new folders on airless spray systems and a new gun, the Versa Gun. Nordson Corporation.

117. Prepaint Treatments
A 4-page brochure describes products for spray, soak and steam phosphatizing, hand-wipe phosphatizing, precleaning, acid rinsing. Northwest Chemical Co.

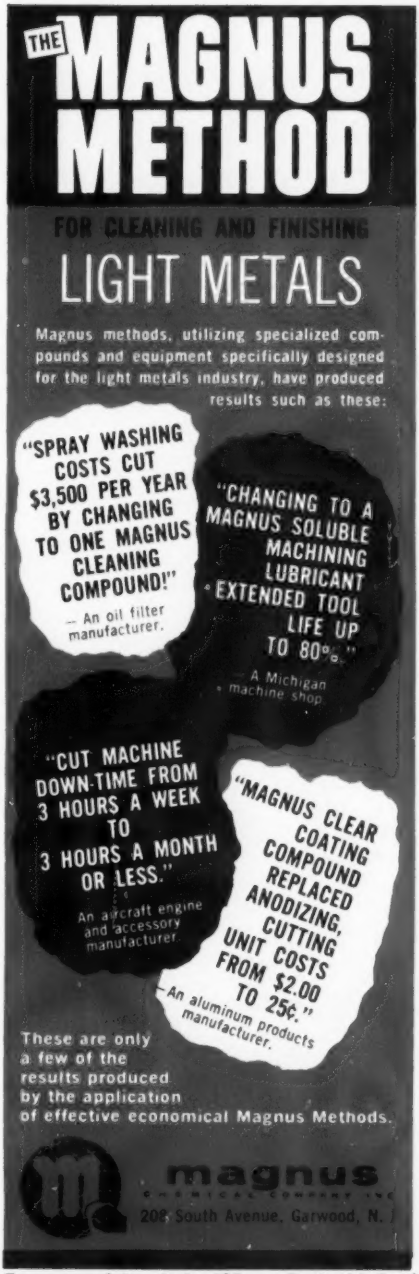
118. Pressure Blasting with Manufactured Abrasives
Special report describes applications for pressure blasting, tells how to select and use silicon carbide and aluminum oxide abrasives. Norton Co.

119. Plating Equipment
Catalog lists plating and processing equipment: tanks, tank linings, plastisol coatings, plating barrels, dipping baskets. Nu-Lite Plating Equipment Co.

120. Preparation of Aluminum for Welding
An 8-page booklet entitled "The Chemical Preparation of Aluminum for Resistance Welding." Includes complete, detailed outlines for four specific weld-preparation procedures. Oakite Products, Inc.

121. New Ultrasonic Cleaning Equipment
Information on ultrasonic cleaning equipment recently developed by Westinghouse. Compact, efficient, sturdy, excellent performance. Westinghouse Electric Corporation, Industrial Electronics Dept.

122. Cold Phosphatizing
Details on cleaners and phosphatizing products that will operate at temperatures 40 to 75 deg. F. cooler than conventional systems. Parker Rust Proof Co.


THE MAGNUS METHOD
FOR CLEANING AND FINISHING
LIGHT METALS
Magnus methods, utilizing specialized compounds and equipment specifically designed for the light metals industry, have produced results such as these:
"SPRAY WASHING COSTS CUT $3,500 PER YEAR BY CHANGING TO ONE MAGNUS CLEANING COMPOUND!"
— An oil filter manufacturer.
"CHANGING TO A MAGNUS SOLUBLE MACHINING LUBRICANT EXTENDED TOOL LIFE UP TO 80%."
— A Michigan machine shop.
"CUT MACHINE DOWN-TIME FROM 3 HOURS A WEEK TO 3 HOURS A MONTH OR LESS."
An aircraft engine and accessory manufacturer.
"MAGNUS CLEAR COATING COMPOUND REPLACED ANODIZING, CUTTING UNIT COSTS FROM $2.00 TO 25¢."
— An aluminum products manufacturer.
These are only a few of the results produced by the application of effective economical Magnus Methods.
magnus
CHEMICAL COMPANY INC
208 South Avenue, Garwood, N. J.
For more data circle 403 on Postpaid Card

Take a lead from the leaders...

Amchem GRANODINE* Phosphate Protection in Depth for Lincoln

Ford Motor Company's fabulous Thunderbird and luxurious Lincoln Continental have established new heights of fine car performance while creating "classic" standards in motor car design.

GRANODINE—The obvious difference in pre-paint treatments

1. Solvent-cleaned—panels failed after 100 hours of accelerated testing.
2. Alkali-cleaned—panels failed after 100 hours of accelerated testing.
3. Granodine-treated—panels excellent after 336 hours of accelerated testing.

Coatings Provide Pre-Paint Continentals and "T-Birds"

Phosphatizing process key to producing rust-proof bodies, long lasting, quality paint finishes

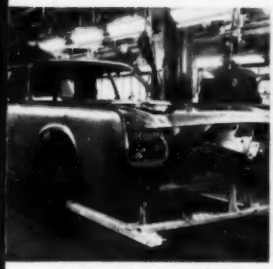
At Ford Motor Company's Lincoln Continental and Thunderbird production plant quality manufacture is the by-word.

High among the many quality operations incorporated into these fine cars is the special attention lavished on the pre-paint chemical treatment of bodies and other steel and galvanized automotive parts.

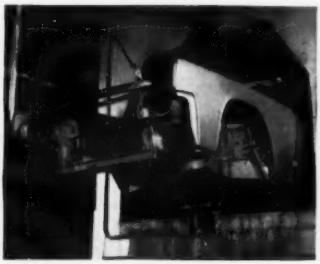
Utilizing Granodine zinc phosphate coatings, this world-renowned producer is providing potential buyers with the ultimate in quality body work, the result of Granodine's greatly improved corrosion resistance and bonding qualities combined with an already highly efficient baked enamel paint system.

Amchem's metal protection techniques assure you that Granodine will meet present day high volume production schedules with minimum maintenance and operator attention.

*Amchem's registered trademark for its conversion coating chemical used to produce phosphate coatings on steel.



Body in white in metal finishing area prior to phosphating.



Granodine-treated body at exit end of phosphate washer.

Phosphatized body is seen in final paint line.

AMCHEM **GRANODINE**

Amchem is a registered trademark of
AMCHEM PRODUCTS, INC. (Formerly American Chemical Paint Co.)
AMBLER, PA. • Detroit, Mich. • St. Joseph, Mo. • Niles, Calif. • Windsor, Ont.

For more data circle 404 on Postpaid Card

123. Color and Corrosion Resistance for All Metals with a Single Treatment
Production information on the Hinac Process, a unique chromate surface treatment that produces excellent resistance to acids, alkalies, solvents, oxidizing agents. Readily applied to mild steel, aluminum, stainless steel, galvanized steel, copper, brass, other metals. Pennsalt Chemicals Corp.

124. Ovens
Information on Radcor electric infrared baking and drying ovens. Radcor, Inc., Subsidiary of Edwin L. Wiegand Co.

125. Electrostatic Painting for Intermixed Sizes
Information on "moving bells" which automatically adjust themselves to paint various sizes of parts running past on a conveyor. Ransburg Electro-Coating Corporation.

126. Rectifiers
Brochure covers a line of regulated d.c. power supplies. Shows models available, describes features and applications. Rapid Electric Co.

127. Paint Conditioner
Complete data on machines for shaking containers of paint to mix and rejuvenate settled-out paint, blends colors in paint. Red Devil Tools.

128. Dry Filters for Spray Booths
Four pages on RP Paint Arrestors. Comparative performance data, construction details, different ways to use dry filters. Research Products Corp.

129. Media for Vibratory Finishing
Information on Ceramihones, barrel finishing shapes that permit you to take advantage of fast-cutting action of vibratory equipment without being penalized by rapid media breakdown and wear. Minnesota Mining and Manufacturing Co., Barrel Finishing Dept., HAD-41.

130. Air Processing Equipment
A 12-page bulletin includes data on ovens, dryers, air heaters and curing systems for use in such industries as pulp and paper, paint finishing, rubber and foam rubber, foundries, plastics and chemical processing. Bulletin No. S-5. J. O. Ross Engineering, Div. of Midland-Ross Corporation.

131. Selecting Barrel Finishing Media
Discussion of problems in the selection of abrasive media and compounds for vibratory and barrel finishing. Illustrations of bonded preforms and hardened steel shapes. Roto-Finish/Ransohoff.

132. Immersion Boiler
Bulletin 5209-A describes features of a line of boilers designed for producing process steam used in heating cleaning, phosphatizing and plating solutions. Sellers Engineering Co.

133. Full-View Filter Chamber
Bulletin 401 describes corrosion-resistant full-view filter chambers with capacities of 1 to 1800 g.p.h. Sethco Mfg. Co.

134. Paint Stripper
Information on Act-O-Strip patented paint stripping compositions, which remove a wide variety of paints at low temperatures, quickly. Solventol Chemical Products, Inc.

135. Vibro-Energy Finishing Mill
Six pages on the Sweco Vibro-Energy Finishing Mill. This unit improves the finish on parts by vibrating a load of parts and abrasive media in such a way that the parts move through the vibrating mass in a spiral pattern. Advantages are discussed. Southwestern Engineering Company.

136. Complete Finishing Systems
Literature on Spra-Con complete finishing systems for applying organic coatings. Data on components such as washers, ovens, flow-coat machines, conveyors, air make-up systems. The Spra-Con Company.

CABLE HOISTS DON'T BELONG IN PLATING & ANODIZING PLANTS

NO SWING AND SWAY, FASTER LIFTING, ACCURATE POSITIONING OF WORK BAR OVER SADDLES, FASTER HORIZONTAL TRAVEL.

SOLBERN RIGID TRANSFER HOIST

WRITE: **FACTORY INSTALLATIONS CORP.**

24-29 JACKSON AVE. • LONG ISLAND CITY, N. Y.

For more data circle 405 on Postpaid Card

Circle numbers on postpaid card opposite page 128 to obtain free literature

137. Nozzles for Washing, Rinsing, Coating
Bulletin 106 describes a complete line of spray nozzles and accessories. Reference chart lists applications and types of nozzles used. A complete spray nozzle reference manual on washing, rinsing, fogging or wetting, coating and related operations. Spraying Systems Co.

138. Automatic Loading Systems
Case histories of a variety of automatic loading operations in conjunction with automatic barrel plating. Detailed engineering drawings. Frederic B. Stevens, Incorporated.

139. Plating Barrel
Data sheet on a plating barrel with "cone button contacts." This type of contact is useful in plating delicate parts without distortion. Barrel is of loose rib and panel design for easy replacement of parts. The Stutz Co.

140. Stripping Copper
A 10-page booklet describes Liquid Sulphur, tells exactly how to use this material for removing deposits of copper. Sulphur Products Co., Inc.

141. Sanders, Air-Operated
Data on portable air-operated sanding machines. Sundstrand Machine Tool Div. of Sundstrand Corp.

142. Lapping-Polishing Machines
Catalog on lapping-polishing machines presents complete descriptions, specifications and other data on four Syntron vibratory lapping-polishing machines. Syntron Co.

143. Etch Primer
Data on Gripalloy, an etch primer available in black and colors. Used as primer or finish coat. Tenax Finishing Products Company.

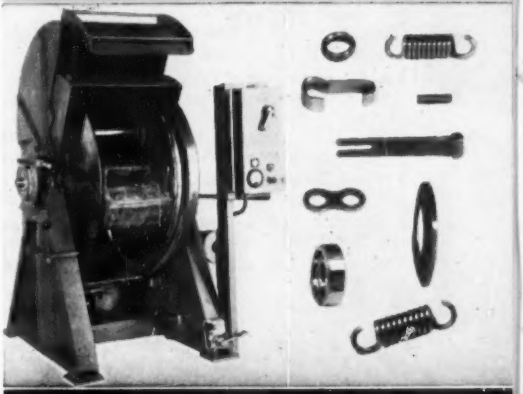
144. Cob Grit for Blasting, Tumbling
Information on corn cob grits that are used as tumbling media and in blast cleaning. Ti-Co Industries, Inc.

145. Titanium Anodizing Cylinder
Data sheet describes and illustrates an all-titanium anodizing cylinder that is useful in bulk processing of bolts, rivets, screws. Requires no stripping, resists acids. Titanium Products Corporation.

146. Brass Plating Solution
Technical bulletin on True Brite brass solution, which is available in a variety of colors. True Brite Chemical Products Company.

147. Phosphatizing Reference Chart
Full information on Paintite and ten other phosphatizing and conversion-coating processes. Includes phosphatizing reference chart. Turco Products, Incorporated.

MICRO-INCH FINISH
OR DE-BURR
IN MINUTES
INSTEAD OF HOURS



WITH THE NEW SMALL WET OR DRY HARPERIZER

Aircraft & Electronic Components,

Bearings, Springs, Needles
Drills, Cutters, Gears,
Carbide Tools

Deburring and Radiusing
Wet or Dry Media

Ask for a Demonstration
Write or Phone (ANdrew 7-2553)
You can finish *better* for *less* with the HARPERIZER

Also manufacturers of the
Finest automatic machines using wheels and fixtures to buff, deburr and polish

The HARPER BUFFING MACHINE CO.
EAST HAMPTON • CONNECTICUT
For more data circle 406 on Postpaid Card

Circle numbers on postpaid card opposite page 128 to obtain free literature

148. Thickness Tester
Bulletin DF describes the Dermitron, an instrument for non-destructive coating thickness determination of metals on metals, metals on non-conductors, non-conductors on metals. Unit Process Assemblies, Inc.

149. Paint Products
Information on a line of industrial paint products. U. S. Paint Co.

150. Hints on Jar Milling
Bulletin DM-290 contains helpful grinding and mixing data plus full details on "U.S." Jar Mills. Process Equipment Div., U. S. Stoneware.

151. Vibratory Tumblers
Data sheets describes and illustrates Vibrol vibratory tumblers. Includes specifications, list of mechanical features. Universal Vibrating Screen Co.

152. Anodes
Folder lists various types of brass, cadmium, copper, lead, nickel and alloy anodes. Includes detailed information on new "T-Bone" nickel anodes, said to offer reduced sludging, smoother deposits, increased surface area and rapidity of anode corrosion. Univertical Corporation.

153. Sealless Pumps
Catalog No. 10, eight pages on a new sealless pump recommended for corrosive chemicals, abrasive slurries, pharmaceuticals, foodstuffs, gases. Complete description of features, exploded drawings to show parts and servicing, tables of performance data, list of materials of construction, typical uses and recommended materials. Vanton Pump & Equipment Corp.

154. Acrylic Coatings
Performance and application information on acrylic-based coatings. The Varnish Products Co.

155. Metal-Decorating Ovens
Information on standard and special metal-decorate ovens and can body ovens. Bulletin 9-L. Young Brothers Co.

156. Protecting Polished Surfaces
Four pages on Neotex protective mesh, a neoprene matting that keeps polished or delicate parts from being scratched or damaged during manufacture, inspection, transit. Used for lining benches or work tables, as a surface for conveyor belts. Research Products Corporation.

157. Steam Trapping and Temperature Control
Problems in steam trapping and temperature control are featured in Sarcoscope, a quarterly publication. Sarco Co., Inc.

158. Design Data for Lateral Tank Ventilation
Bulletin dt-7 contains 37 pages of useful information on processes and equipment for removing fumes from tanks used in acid pickling, alkaline cleaning, electroplating, dipping and hot rinsing. Includes tables for use in selecting the proper bifurcator; discussion of ventilating problems; diagrams of various types of exhaust and duct systems; descriptions and illustrations of company's line of fans and ventilators. DeBothezat Fans, A Div. of Ametek, Inc.

159. Degreasing Solvent
Data Sheet No. 814 gives specifications, description and uses for Nialk Trichlorethylene, metal degreasing grade. Hooker Chemical Corp.

160. Rack Trucks
Information on a complete line of production handling equipment consisting of 27 styles of trucks with various types of racks to carry painted and finished products through production and assembly operations. Wilder Mfg. Co., Inc.

161. Rebuilt Plating and Metal Finishing Equipment
Complete list of used equipment: platers, anodizers, rectifiers, buffing and polishing equipment, enamelers, and so on. M. E. Baker Co.

162. Spray Equipment for Multiple-Component Materials
Bulletin A-54-5 on the Binks Turbulator gun and Formulator. This equipment is designed for mixing multiple-component organic coatings within the spray gun and then spraying them immediately. Such materials are used in spraying films of various plastics and foams which must be mixed with a catalyst and then sprayed immediately, before the chemical reaction causes hardening. Binks Manufacturing Company.

ZINC PLATERS: Purify your cyanide zinc solutions
with
McKeon's **Zinc-Brite**
Regular use keeps zinc solutions clear.
Brightens Work.
Write—Phone—Wire Collect for free brochure
Sulphur Products Co., Inc.
McKeon Bldg., 621 W. Pittsbugh St., Greensburg, Pa.
For more data circle 423 on Postpaid Card

163. Tumbling Media, Sintered
Bulletin describes a new type of metal barrel-tumbling media that is produced by a sintering process. Dixon Sintaloy, Incorporated.

164. Tumbling Equipment
Catalog No. 50 contains 20 illustrated pages on Baird Barrel finishing and tumbling equipment. The Baird Machine Company.

Classified Advertising

Used Two Months — Excellent Condition
1 Detrex Kem-O-Dryer, Stainless
Model PD-750, size 200-1-3 (20" x 24" x 54" deep), Equipped for Gas or Steam. Cost New $1,765.00 — Will Sell for $450.00.
GRAND TRAVERSE METAL CASKET COMPANY
TRAVERSE CITY, MICHIGAN

SOUTH FLORIDA TEST SERVICE, INC.
Testing—Inspection—Research—Engineers
Consultants and specialists in corrosion, weathering and sunlight testing.
4301 N. W. 7th St. • Miami 44, Florida

WANTED
Partner, or will lease or sell going plating shop in Chicago. Have other interests, cannot handle alone. Good accounts in chrome, nickel, brass. Partner must be capable plater. Reply Box No. 123, c/o Products Finishing, 431 Main Street, Cincinnati 2, Ohio.

Buffing Wheel factory, fully equipped. Manufacturing air buffs and conventional type buffs. For Sale. Good Opportunity for sales organization in metal finishing field. Will also consider merger. Write Box 122, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

WANTED: Distributors and agents for top quality line of cadmium, zinc and copper brighteners, by young and aggressive Chicago-based concern. Liberal commission. Replies held strictly confidential. Write to Box 125, c/o PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio.

SITUATION WANTED
Have had general experience including supervision of plating such as copper, nickel, zinc, chrome, cadmium and also bonderizing and parkerizing in metal finishing. Also other varied chemical experience.
Box No. 126, c/o Products Finishing, 431 Main Street, Cincinnati 2, Ohio.

VACUUM PLATING MANAGER
for large nationally-known east coast jewelry manufacturer. Jewelry background preferred. Must be thoroughly familiar with all phases of Vacuum Plating Process. Excellent permanent opening for man capable of assuming the top position in a large vacuum plating division. Excellent position. Established Company. Our employees know of this ad. Box 124, c/o Products Finishing, 431 Main St., Cincinnati 2, Ohio.

Space on this page is available for advertising of Services, Employment, Used Machinery & Equipment, Etc. Sold in inch units, one col. wide.
Rate: $25 per col-inch.
PRODUCTS FINISHING
431 Main St. Cincinnati 2, Ohio

PAINTING AND PLATING FOREMEN
Excellent opportunity for aggressive individuals with job shop experience in supervision and electroplating or painting. Positions require individuals with the ability to efficiently manage and control a production department consisting of up to twenty-five employees and a variety of metal finishes. Excellent salary, profit sharing plan and many other company benefits. We are the largest job shop in the Chicago area and are continuing to grow. If you are interested in a challenging job with a future, send complete resume to:
Personnel Department
Adolph Plating, Inc.
832 South Central Ave.
Chicago 44, Illinois

OPPORTUNITY SECTION

INDUSTRY NEWS

Allied Research Opens Bridgeport Warehouse

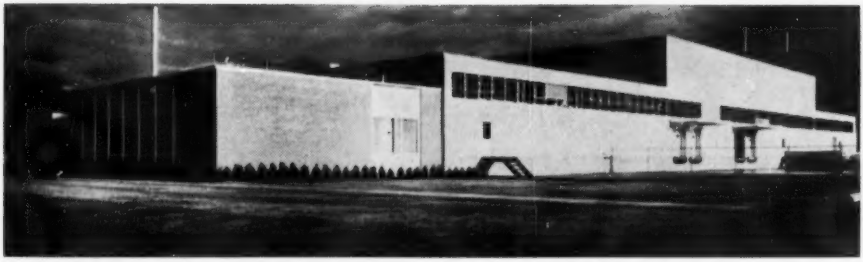
Allied Research Products, Inc., Baltimore manufacturer of chemicals, equipment and supplies for finishing, recently opened a new warehouse at 35 Holland Ave. in Bridgeport, Conn.

The opening was marked with an "open house" attended by more than 300 businessmen, city officials and Allied Research officials.

In addition to housing stocks of Allied Research products, the warehouse also contains a chemical laboratory for analytical service and serves as the company's northeast sales district headquarters. Operations of the warehouse are under the direction of Frank Richard, district sales manager.

Samuel J. Tedesco, Bridgeport Mayor, cuts ribbon to mark opening of new Allied Research Products, Inc., warehouse in that city. On hand were hosts (l. to r.) Frank Richard, district sales manager, J. A. Cairns, sales vice president, and Harry C. Irvin, president of the company.

New warehouse, office and laboratory for Allied Research in Bridgeport, Connecticut.



New plant in Scarborough, Ontario, Canada, for Wyandotte Chemicals Corporation

Wyandotte Opens New Canadian Plant

With the recent opening of its new plant in Scarborough, Ontario, Wyandotte Chemicals of Canada Ltd., J. B. Ford Division, began producing a complete line of cleaning products in Canada.

Among the products manufactured at the new Canadian plant are electro-cleaners, soak and barrel cleaners, cleaning and phosphatizing products, emulsion cleaners, rust and scale removers, steam cleaners, paint strippers, spray cleaners; products for aluminium finishing including deoxidizers, brighteners, smut or carbon removers; and products for industrial plant maintenance.

Terence Neill, a native of British Columbia, who has for 9 years been Wyandotte's Canadian sales manager,

SPRA-CON

COMPLETE FINISHING SYSTEMS

POWER SPRAY WASHERS
DRYING OVENS
PAINT BAKING OVENS
FLOW COAT MACHINES
AIR REPLACEMENT SYSTEMS
CONVEYORS

SEND FOR FREE CATALOG

the SPRA-CON COMPANY

3600 ELSTON AVE. • CHICAGO 18, ILLINOIS

For more data circle 407 on Postpaid Card

has been elected a director of the new company and named director of sales, according to Ford Ballantyne, Jr., president.

P. H. H. Ridout of the firm of Manning, Bruce, Peterson & Ridout, Barristers and Solicitors, Toronto, becomes secretary.

Canada's First Detinning Plant Begins Operation

Canada's first detinning plant went "on stream" in Hamilton, Ontario early this month. Opening ceremonies for the new $1.25-million facility of M&T Products of Canada Ltd. were attended by several hundred Canadian business executives, educators and members of government. The company is a subsidiary of Metal & Thermit Corporation, New York.

The alkaline detinning process is used to remove tin from high quality tinplate scrap produced in can-making operations. Tin chemical byproducts now provide Canada with her first domestic source of sodium and potassium stannate, which are used for immersion coating of aircraft and automotive engine pistons. Stannates also are used in tin electroplating and plating of tin alloys.

New Facilities for Vulcanium Corporation

Vulcanium Corporation is moving from Highland Park, Ill. to a recently acquired building in Glenview, Ill. Titanium racks and equipment for anodizing, electroplating and electropolishing will be fabricated in the Glenview plant.

NEW POSITIONS

The Hubbard-Hall Chemical Company, Waterbury, Conn., has appointed **Roger G. Stevens,** Greensboro, North Carolina, metal finishing technical representative.

Mr. Stevens will serve the Carolinas, Virginia and West Virginia.

Roger G. Stevens

Robert B. Stevens

Robert B. Stevens named manager of the Midwestern Division of **Maas & Waldstein Co.,** Newark, N. J., manufacturer of industrial finishes and chemical coatings.

★ ★ ★

Gilbert D. Dill has rejoined **Wheelabrator Corporation** of Mishawaka, Indiana, as staff assistant to President James F. Connaughton.

★ ★ ★

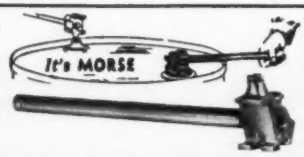
Marcel W. Tretout has been appointed technical service representative in Union County, N. J., by **Oakite Products, Inc.,** manufacturer of industrial cleaning and surface treating compounds.

Send NOW for this FIT-ALL

DRUM PLUG WRENCH

Instantly loosens, tightens 95% all plugs or bungs in steel drums. Has 16" extra-strong steel tubing handle. Wgt. only 2 lbs.

Order 1 or more today!



THOUSANDS IN USE saving time, labor, accidents!

SATISFACTION GUARANTEED..... $4.10

Non-sparking type.....$6.30

Plus Parcel Post

MORSE MFG. CO., Inc.

762 W. Manlius St., E. Syracuse, N. Y.

For more data circle 408 on Postpaid Card

Frederick Gumm Chemical Co., Inc., Kearny, N. J., has appointed **Gregory P. Martusevich** as research chemist in the Clepo Laboratories.

George A. Stutz

G. P. Martusevich

George A. Stutz, chairman and chief executive officer of **The Stutz Company,** Chicago manufacturer of electrochemical and finishing equipment and supplies, is embarking on a new career at the age of 72 . . . semi-retirement in Florida.

Though the elder Mr. Stutz is changing his status, his two sons continue in their present positions with the organization . . . **George L. Stutz** as president and **Richard G. Stutz** in an executive sales capacity.

★ ★ ★

Jack L. Pettit has joined the **Circo Corporation,** Clark, N. J., as director of manufacturing.

★ ★ ★

Four group vice presidents have been appointed by **Metal & Thermit Corporation.**

H. E. Hirschland, group vice president, with the Commercial Development and Research Divisions reporting to him; **B. W. Weber,** group vice president in charge of the Manufacturing, Employee Relations and Administration Divisions; **J. L. Oberg,**

(continued)

Fortune
TUMBLING MEDIA

for **Deburring** and **Finishing**

Preforms in over 300 shapes, sizes and bonds for all barrel and vibratory operations.

- Finest bonding materials
- No "roll-over" of burrs
- Minimum media fracture
- Maximum production

Our FREE lab service will promptly test your parts and recommend proper tumbling media, without obligation.

WRITE TODAY FOR OUR TUMBLING MEDIA FILE . . . -including valuable information on proper selection of preforms.

Fortune Industries, Inc.
11770 DEXTER RD. CHELSEA, MICH.
Phone GR 9-3621

For more data circle 409 on Postpaid Card

Joel R. Field, Jr.

Donald W. Oakley

Richard D. Taylor

John R. Strom

group vice president in charge of the Minerals, Ceramics and Welding Divisions; and **D. W. Oakley,** group vice president for the Chemicals, Coatings and Plating Divisions.

★ ★ ★

Joel R. Field, Jr. is now associated with **Mitchell-Bate Co.,** rack manufacturer, Waterbury, Conn.

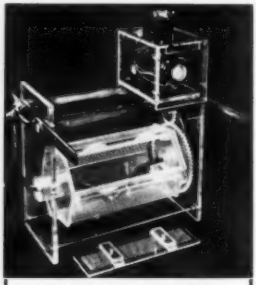
G. W. Balz, president of **Roto-Finish Co.,** Kalamazoo, Mich., and the **Ransohoff Co.,** Hamilton, Ohio, has announced the promotion of **John R. Strom** to vice president and appointment of **Richard D. Taylor** as marketing manager.

★ ★ ★

Daniel R. Savage named service manager for the American operations of **SAMES** (Société Anonyme de Machines Électrostatiques), major French electronics firm. The announcement was made by Claude E. Boillot who heads **SAMES** in this country.

★ ★ ★

Isidor Elias appointed to the research staff of **Acoustica Associates, Incorporated.**



Look! Investigate, compare the new indestructible portable plating barrels.

EXCLUSIVE

Regardless what type of barrel your requirements may be Nu-Lite has the right barrel for you!

Write today for complete details.

NU-LITE PLATING EQUIPMENT CO., INC.

777 MEEKER AVE. • BROOKLYN 22, N. Y.

For more data circle 410 on Postpaid Card

Cut* TUMBLING *Costs

With Ti-Co

COB MEAL

A Grade for Every Application

Drying — Polishing

Deburring — Finishing

TI-CO INDUSTRIES, INC.

P. O. BOX 185 • TIPTON, INDIANA

Phone or Telegraph: FEderal 2-5942, Elwood, Indiana

For more data circle 411 on Postpaid Card

E. H. Peterson

W. M. Campbell

The election of **W. M. Campbell** as chairman of the board and **E. H. Peterson** as president has been announced by **Magnus Chemical Co., Inc.**, Garwood, N. J.

★ ★ ★

Carl P. Rommel elected vice-president, research and development of the **Bradley & Vrooman Co.**, Chicago.

Nathan H. Dewing, Jr. appointed a representative for **Metal & Thermit Corporation's** International Division. His offices are in M&T's New York headquarters.

★ ★ ★

Ralph Macon has joined **Hooker Chemical Corporation's** International Division as project manager, International Development. He will work in the company's New York office.

COMPANIES

Alvey-Ferguson Appoints Illinois Representative

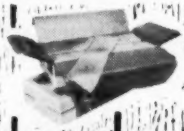
J. W. Harvey Company, Lyons, Illinois, has been appointed representative for Alvey-Ferguson industrial finishing equipment.

The Alvey-Ferguson Company, Cincinnati, makes industrial washers, ovens, phosphatizing machines, spray booths and conveying equipment.

In WOOD FINISHING you Need Bond® TACK CLOTHS

IN ROLLS

Cut off any size piece as needed.



IN BULK

Size is 18" x 36"—folded to 4½" x 18" or 9" x 18" for ease of handling. Cut and folded—ready to use.

To Insure a SPECK-FREE FINISH— IMPROVE QUALITY — SAVE TIME AND WORK!

There's a big difference between a finishing job where every speck of dust has been removed—and the poor-quality finish resulting from a dusty surface. A quick wipe with a Bond TACK CLOTH before finishing is real economy—it insures a dust-free surface every time!

There's a big difference in TACK CLOTHS, too—that's why BOND produces four different meshes of cloth with several types of formulation to give you the cloth that best "fits" your special needs, whether wood or metal surfaces are involved.

Packed in 150 yard rolls of 36" wide cloth or in handy cartons, as you prefer. Also individually packed in Glassine Envelopes—144 to the carton. Stays soft and tacky until the last bit is used up. Choice of Standard, extra Tacky or less Tacky—in WHITE or in GOLD.

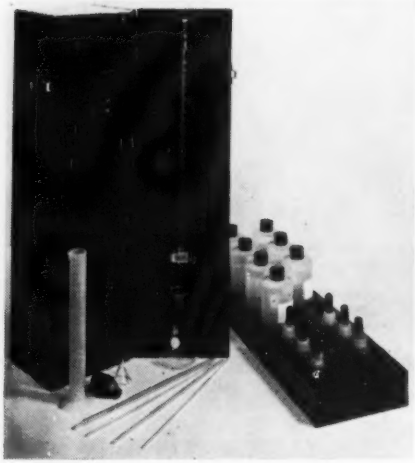
COMPARE RESULTS — SAMPLES SENT UPON REQUEST FOR PROOF-TEST!

Bond® "The Tacky Wiper Specialist"

CHEMICAL PRODUCTS CO.

2106 W. FULTON AVE. CHICAGO 12, ILL.

For more data circle 412 on Postpaid Card



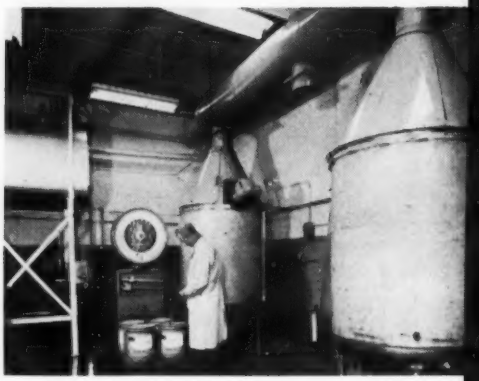
Trouble-shooting kit for MacDermid salesmen

MacDermid Offers New Trouble-Shooting Service

MacDermid, Inc. has developed a kit for solving problems. The company's salesmen can carry the kit into the finishing room and have everything needed to pinpoint troubles accurately so that recommendations for eliminating the difficulty can be made. Since samples do not have to be sent to a laboratory, troubles are corrected quickly.

Enthone Gears for Production of Electroless Plating Solutions

Enthone, Inc., New Haven, Conn.



New facilities for producing "Enplate" chemical plating concentrates

Subsidiary of American Smelting and Refining Co. recently installed new facilities for upping production of its chemical plating concentrates.

The recently introduced "Enplate" concentrates are produced using deionized water, with all equipment constructed of stainless steel and plastic to avoid contamination.

Sharpe Manufacturing Co. Reorganizes Regional Sales

Sharpe Manufacturing Company, Los Angeles producer of portable paint spray guns and associated equipment, has completed a major reorganization of its regional sales and service program, according to an

IDEAL TACK RAGS

FOR A PERFECT FINISH

Bulk, Bagged, 72 yd. pieces in continuous lengths. Also Rolls.

Immediate Delivery

IDEAL CHEMICAL COMPANY

1499 DEAN DRIVE • SOUTH EUCLID 21, OHIO

For more data circle 413 on Postpaid Card

Send Your *REALLY TOUGH* Racking Problems to:

RACK SPECIALISTS

PLATING — ANODIZING
DEGREASING — PAINTING

MITCHELL-BATE CO.

APPLICATORS of PLASTISOL

1040 South Main St. • Waterbury, Conn.

For more data circle 414 on Postpaid Card

announcement by Kenneth Sharpe, president.

For the first time, southeastern states are included, Mr. Sharpe said. In addition, members of the sales staff were re-assigned to strengthen market coverage in the area between the Rocky Mountains and the Mississippi River and in the Far Western States.

Comprising the new southeastern sales group will be Noel Moore, Oklahoma; under the direction of William Spence, Texas; R. T. Douglas, Arkansas, Louisiana, Mississippi, and Memphis, Tennessee; Edward Thomas, Alabama; Edward Kerr, Georgia; Charles Mitchell, Florida; and Joseph Williamson, North and South Carolina and southern Virginia.

Les Dulin will service Nebraska, Iowa, Minnesota, and North and South Dakota; and Harold Snyder, Missouri and Kansas.

Under the direction of J. W. "Pat" Dayton, area manager for northern California, Oregon and Washington, will be Dan Weber, covering the northern California and Reno, Nevada, areas. Working with Floyd Stewart, area manager for southern California, Arizona, New Mexico and Las Vegas, Nevada, will be Warren Berls, covering the southern central valley area and Darrell Matthews, Arizona and New Mexico.

Edward Garrett will service Utah, Idaho, Colorado, Wyoming, Montana.

Pioneer Reps Discuss Sales Campaign

Representatives of The Pioneer Rubber Company's Industrial Glove

(continued)

You can't beat Sanding with a

MITY-MIDGET

LIGHTWEIGHT, FAST, DEPENDABLE

Weighing only 4 pounds . . . yet so powerful you can't stall it by standing on it . . . this Air Driven, Orbital Action Sander gives a perfect finish, quickly and easily.

NATIONAL N D DETROIT

See how "Mity-Midget" can save you time and money. Write for a complete catalog today.

NATIONAL-DETROIT, INC., ROCKFORD, ILLINOIS

For more data circle 415 on Postpaid Card

Pioneer sales meeting. Seated, left to right: Lester Koenig, Philadelphia; Bill Casselman, Los Angeles; Jim Alpine, Ashtabula, Ohio; Ozzie Schindler, Cleveland (Export Department); Al Marshall, Dallas; Andy Yonis, New York City; M. J. Craver, Carr Liggett Advertising, Cleveland; William Krafft, Buffalo; Jack Carlson, Boston; Charles Allen, Atlanta, and Jack Knight, Chicago (not pictured). Standing, left to right: Donald Evans, Pioneer Advertising Manager; J. H. Gibson; Alice E. Williams; John R. Jones, and True E. Read, Pioneer special field representative.

Al Marshall, right, manager of The Pioneer Rubber Company of Texas, accepts a sales award on behalf of his staff. The award was presented to Mr. Marshall by Pioneer General Sales Manager John R. Jones during the recent 1961 National Safety Congress and Exposition in Chicago.

Division met for a sales seminar during the recent National Safety Congress and Exposition in Chicago. Pioneer President J. H. Gibson, General Sales Manager John R. Jones, and Mrs. Alice E. Williams, in charge of industrial glove sales for the company, led the group in discussion of plans for the new sales year.

BRUKO . . The only company in America with a full line of processing materials. Order your specially formulated products for cleaning, buffing, and polishing from

BRUCE PRODUCTS COMPANY

HOWELL • MICHIGAN

For more data circle 416 on Postpaid Card

"GRIPALLOY"

. . . Attractive satin sheen ETCHING PRIMER in black and colors . . . Often used as finish coat . . . Air dries in minutes . . .

. . . Amazing tight adhesion to 25 different metals as reported by a large electrical manufacturer.

. . . Excellent resistance to Salt Spray, Gasoline, and Solvents . . .

TENAX, Newark, N. J.

Lacquers—Enamels

Synthetics—Vinyls

For more data circle 417 on Postpaid Card

Plastics Finishing Service

A specialized service for producing specified finishes on plastic products has been announced by Rose Plastic Finishers, 2749 N. Mannheim Rd., Des Plaines, Illinois. A variety of preparatory and finishing processes produce the finish desired.

Walter L. Pinner Becomes Consultant

Walter L. Pinner has announced his intention to establish residence and a consulting service in the Southwest, following a vacation trip.

A past national president and honorary member of the American Electroplaters' Society and of the Institute of Metal Finishing of England, Mr. Pinner had been with McGean Chemical Co., Cleveland, for the past three years. Prior to his association with McGean he had been technical director of research and manufacturing for Houdaille Industries, Inc., one of the largest nickel-chrome plating operations in the country. He served Houdaille for 35 years.

During November of this year, Mr. Pinner visited England on behalf of the Pyrene Company of London, for whom he has acted as a consultant for fifteen years.

During his long and successful business career, Mr. Pinner has interested himself in basis metal preparation; copper, nickel and chromium plating; and corrosion. Many of his publications on these subjects have resulted in awards and honors to him.

Mr. Pinner was instrumental in setting up A.E.S. Project 15 and has served as Chairman of the Project Committee since its inception. The work of that group has produced the CASS and Corrodkote tests which are now in widespread use.

SPEED PLUS ECONOMY
MEANS PROFIT IN YOUR
METAL FINISHING OPERATIONS

• • •

Get the Facts on UNIVERSAL'S V-30—8 cu. ft. VIBROL and the V-20—1 ½ cu. ft. VIBROL Metal Finishing Machines — TODAY!

• • •

From the Manufacturers of High-Speed Vibratory Equipment Since 1919

UNIVERSAL VIBRATING SCREEN COMPANY

P. O. Box 942 • Racine, Wisconsin

For more data circle 418 on Postpaid Card

Corrosion of aluminum in heat exchangers is the subject of the discussion between this Wyandotte Technical Service representative and a customer at the National Metal Exhibition at Cobo Hall, Detroit. Folder is "Wyandotte Products for Aluminum Processing."

Diamond Alkali Acquires Fiber Chemical Corp.

Acquisition of Fiber Chemical Corporation, Cliffwood, N. J., has been announced by Raymond F. Evans, chairman and president, Diamond Alkali Company.

A producer of organic chemicals and inorganic specialties, Fiber Chemical will be operated as a wholly owned subsidiary of Diamond Alkali Company.

A. B. Tillman, Diamond's general manager, Soda Products-Chrome Division, has been elected president of the new subsidiary, and Fiber Chemical's facilities will be operated as a part of that division. G. V. DuPont, special staff assistant at Diamond, will assume the responsibilities of vice president, and will be based at the Cliffwood plant. Secretary and treasurer will be R. H. Armor, Diamond's Controller.

Fiber's founder and president, F. F. Axelrad, will remain with the subsidiary as director of research and development.

MEETINGS

A. E. S. Midwest Regional Meeting Held at Argonne

The Third Annual Technical Seminar sponsored by the Midwest Regional Council, A. E. S., attracted a capacity crowd of 241 on Saturday, October 28. The program, featured by excellent planning and timing, was held at the Argonne National Laboratories, near Lemont, Illinois.

The affair brought out a good rep-

INDUSTRIAL ABRASIVE COB PRODUCTS

- COB GRITS (Blasting)
- COB FLOUR (Foundry)
- COB MEAL (Tumbling & Drying)
  For Plastic and Metal Finishing

TI-CO INDUSTRIES, INC.
P. O. BOX 185 • TIPTON, INDIANA
Phone or Telegraph: FEderal 2-5942, Elwood, Indiana

For more data circle 419 on Postpaid Card

PLENTY OF MEAT

"All in all I must say I feel well pleased with your course. It contains plenty of meat!" writes Ford Motor plating technician, E. M. Olmstead. You too will be well pleased with the meat of ELECTROPLATING KNOW HOW. There's lots in this unique home study course for you to grow on. Write Dr. Joseph B. Kushner, Electroplating School, Box 2066P, Evansville 14, Indiana, **today!**

For more data circle 420 on Postpaid Card

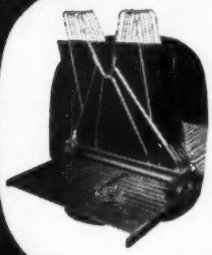
resentation from the sponsoring A. E. S. branches: Chicago, Milwaukee, Mississippi Valley, St. Joseph Valley, St. Louis, and Rockford. Importance of the meeting can be judged further by the fact that A. E. S. Past Presidents Kelly, Wysong, and Wesley attended, along with A. E. S. President Chester G. Borlet, 1st Vice President Manuel Ben, and 2nd Vice President Frank O. Beuckman.

A three-part program was arranged by Chairmen Dr. Jay H. Monaweck and Clyde Kelly. There were eight papers presented during the all-day Symposium on the subject "Plating on Uncommon Basis Metals." These papers were: "Electroplating on Uranium," by Dr. Jay H. Monaweck, Argonne National Laboratories; "Electroplating on Chromium and Its Alloys," by Dr. George Dubpernell, Metal & Thermit Corp.; "Plating on Precious Metals," by Dr. D. Gardner Foulke, Sel-Rex Corp.; "Electroplating on Uranium," by James K. Gore, Los Alamos Laboratory, Atomic Energy Commission; "Plating on Tungsten," by Christopher Marzano, Amphenol-Borg Electronics Corp.; "Plating on Titanium," by William B. Harding, Bendix Corp.; "Plating Various Metals on Silicon," by Dr. George Wertwijn, Hoffman Electronics Co.; "Deposition of Uranium from Molten Salts," by Christopher Marzano.

Second part of the program included tours of several parts of the Argonne

(continued)

SICON® PROTECTS even in HOT OVENS



Young Brothers Co., Cleveland, a leading manufacturer of industrial ovens for the metal decorating field, uses SICON finish to protect oven wickets. Printed metal sheets are oven-dried before being formed into signs, cans, etc. As they pass through the 100 ft. oven the Sicon-coated wickets hold them in position as shown. SICON has proved most satisfactory because it keeps wickets clean, rust-free, and unaffected by temperatures in the 400°-600°F. range. Why not try SICON on your product! Write Dept. L-6.

Sicon®
Hi-Temperature Finish
by MIDLAND
Industrial Finishes Co.
Waukegan, Illinois

For more data circle 421 on Postpaid Card

Fig. 1—Panel members discuss a question during the Work Shop Session on "Organic Coatings." Panel members (left to right) are: J. M. Andrus, Croname, Inc.; Frank Foreman, Barber-Colman Co.; Moderator T. O. McCullough, National Lock Co.; James F. Wright, Wright Metal Processors; Peter Iwema, E. I. du Pont de Nemours & Co., Inc.

Fig. 2—The Work Shop Panel on "Cleaning" considered many problems such as cleaning of red brass, effective carbon removal prior to pickling and plating, proper use of ultrasonics, cleaning of heat-treated parts. One general comment agreed upon was that it is difficult if not impossible to rate or judge a cleaner by any criterion other than the results obtained in actual production. Panel members shown (left to right) are: Dr. E. B. Saubestre, Enthone, Inc., moderator; Robert Bender, Oakite Products, Inc.; Richard B. Chalker, Northwest Chemical Co.; Clarence R. Kolzow, Western Electric Co.; Edward F. Stack, MacDermid, Inc.; R. B. Goodsell, Ardco, Inc. (PRODUCTS FINISHING Staff Photographs)

Laboratories. Guides discussed some of the work being done at Argonne in atomic research and development.

Third part of the all-day educational program consisted of four Work Shop Panel meetings on the following subjects: "Organic Finishing," (Fig. 1), "Pickling and Bright Dipping," "Cleaning," (Fig. 2), "Barrel Plating." The sessions on "Pickling and Bright Dipping," and "Barrel Plating" are reported at some length beginning on page 66 and page 82.

Members of the A. E. S. Midwest Regional Council responsible for the success of this most important educational meeting, in addition to Chairmen Monaweck and Kelly, are: L. L. Diveley, Cutler-Hammer, Inc., chairman of the Midwest Regional Council; R. Scott Modjeska, Scientific Control Laboratories, Inc., educational chairman; Paul Glab, Northwestern Plating Works, registration chairman; Harold Ellis, Commercial Wire Products Co., and Alexander Alexander, Cowles Chemical Co., publicity co-chairmen.

A.S.T.M. Session on Electroforming February 6-7 in Dallas

A.S.T.M. Committee B-8 will hold a two-day session on "Electroforming —Applications, Uses and Properties of Electroformed Metals," during A.S.T.M. Committee Week February 5-9 at the Statler-Hilton in Dallas, Texas.

The session will include papers and discussions on the solutions used, the techniques employed and the applications of the science.

A. D. Squitero and W. L. Pinner are co-chairmen of the symposium. Program is as follows:

Session A

9:00 A.M., Tuesday, February 6

Introduction—Solutions and Deposit Properties

Chairman Dr. E. B. Saubestre

1. *Introduction to Electroforming*
   —Dr. A. Kenneth Graham, Graham, Savage and Associates, Inc., Jenkintown, Pennsylvania
2. *Modern Electroforming Solutions and Their Applications*
   —Myron B. Diggin, Hanson-Van Winkle-Munning Company, Matawan, New Jersey
3. *Physical and Mechanical Properties of Electroformed Nickel at Elevated Temperatures*
   —C. H. Sample and B. B. Knapp, International Nickel Company, Inc., New York, New York
4. *Physical and Mechanical Properties of Electroformed Copper*
   —William H. Safranek, Battelle Memorial Institute, Columbus, Ohio

TERRIFIC VALUES!

Rebuilt and Guaranteed

PLATING & METAL FINISHING EQUIPMENT

PLATERS

1—10000/5000 AMPERE, 6/12 V. 40° C. **CHANDEYSSON** Synch.
1—7500/3750 AMPERE, 9/18 VOLT, **H-VW-M,** Synch. 40° C.
1—6000/3000 AMPERE, 6/12 VOLT, **ELECTRIC PRODUCTS,** Synch.
1—5000/2500 AMPERE, 12/24 VOLT, **CHANDEYSSON,** Synch.
1—5000/2500 AMP., 9/18 V., 40° C., **CHANDEYSSON,** Synch.
1—5000/2500 AMPERE, 6/12 VOLT, 25° C. **CHANDEYSSON,** Synch.

ANODIZERS

1—1000 AMPERE, 40 VOLT, **CHANDEYSSON,** 25° C. and other sizes in stock for immediate delivery; write for details.

RECTIFIERS

1—**H-VW-M** Selenium 5000 Amp., 6 V. S.C.F.C. 440/3/60.
2—**H-VW-M** Selenium 3000 Amp., 6 V. S.C.F.C. 440/3/60.

MISCELLANEOUS

2—R-100 **RONCI** Enamelers.
3—**LASALCO** Ball Burnishers, No. 1, 2 & 4, Lined or Unlined.
10—Buffing Lathes — **HAMMOND, DIVINE, U. S.,** etc., from 3 H.P. to 20 H.P. Single & variable speed.
3—**ACME** Semi-Auto, B/10 Buffing Machines.
1—**PRODUCTION** Model A pipe polisher with feed troughs.
3—**PRODUCTION** No. 101 pipe polishers. Individual or in tandem.
2—Model A **NIEHAUS** fume separators. 1 steel and 1 S. S.

PARTIAL LISTING
Write for Complete List

M. E. BAKER CO.
Klrkland 7-5460
55 Wheeler St., Cambridge 38, Mass.

For more data circle 422 on Postpaid Card

Session B

2:00 P.M., Tuesday, February 6

Engineering, Automotive, Sound and Miscellaneous Parts Manufacture

Chairman A. H. DuRose

1. *Practical Methods in the Use of Electroforming Masters, Mandrels and Matrices*
   —Frank R. Bottomley, Gar Precision Parts, Inc., Stamford, Connecticut
2. *The Application of Electroforming to the Manufacture of Disc Records*
   —Dr. A. M. Max, Radio Corporation of America, Indianapolis, Ind.
3. *Electroforming Plastic Molds for the Automotive Industry*
   —Phil J. Ritzenthaler, Plating Engineering Company, Milwaukee, Wis.
4. *Manufacture of Typing Wheel Electrotypes and Other Electroformed Piece Parts*
   —Kenneth W. Franks, Teletype Corporation, Skokie, Illinois

Session C

9:00 A.M., Wednesday, February 7

Aviation and Aerospace Applications

Chairman Dr. R. B. Saltonstall

1. *Electroforming Hardware for Aerospace Vehicles*
   —D. L. Allie and J. C. Ladd, General Dynamics Corp., Fort Worth, Texas

Dr. E. B. Saubestre

A. D. Squitero

W. L. Pinner

A. H. DuRose

2. *Alloy Electroforming for High Temperature Aerospace Applications*
   —Myron E. Browning, General Dynamics Corp., Fort Worth, Texas

Dr. R. B. Saltonstall

3. *Electroforming Supersonic Pitot-Static Tubes*
   —Frank K. Savage, Savage-Rowe Plating Company, Inc., Kalamazoo, Michigan

PF Congratulates the Detroit Branch A.E.S. on the occasion of its 50th anniversary.

4. *Electroforming of Venturi Type Liners for Wind Tunnels and Other Applications*
—Paul C. Silverstone, Electroforms, Inc., Gardena, California

Session D

2:00 P.M., Wednesday, February 7

Open Forum Discussion
Chairman A. D. Squitero

1. Movie — The Manufacture of Electrotype Printing Plates
2. Open Forum Discussion

TRAINING COURSES

Free Electroplating Course in Brooklyn

The course of study in electroplating given at the Fort Greene Evening High School, 29 Fort Greene Place, Brooklyn 17, New York, will begin its Spring Term on February 1, 1962.

The session is divided into classroom discussion and laboratory experiments. Classroom topics include simple calculation, reading graphs, chemistry of the plating tank, pH, wetting agents, pitting, deionizing. Laboratory experiments include solution analysis, Hull cell studies, anodizing.

Registration will be held January 29, 30, 31, 1962. Class sessions will commence Thursday, February 1, 6:45 P.M. Classes will meet on Tuesdays and Thursdays from 6:45 to 8:15 P.M., including about 6 Fridays. The term begins February 1, 1962 and ends June 26, 1962. Register with L. Serota in Rooms BW17 or 3E12.

MEETINGS of INTEREST to FINISHERS

Dec. 15-16. Annual Educational Session and Banquet, Newark Branch, A.E.S., Robert Treat Hotel, Newark, New Jersey.

Dec. 16. Dinner Dance, Bridgeport Branch, A.E.S., Stratfield Hotel, Bridgeport, Conn.

AGATEEN

Our Compliments of The Season

AGATE LACQUER MFG. CO., INC.
SERVING INDUSTRY SINCE 1927
11-13 43rd Road
Long Island City, N. Y.
Stillwell 4-0660-1

AGATEEN
THE LAST WORD IN QUALITY

For more data circle 424 on Postpaid Card

Jan. 13. Ninth Interim Meeting, A.E.S. (National), Hotel Marott, Indianapolis, Indiana.

Jan. 20. Annual Meeting, Grand Rapids Branch, A.E.S., Pantlind Hotel, Grand Rapids, Mich.

Jan. 27. Annual Educational Session and Banquet, Chicago Branch, A.E.S., Conrad Hilton Hotel, Chicago, Ill.

Feb. 5-9. Committee Week, American Society for Testing and Materials, Statler-Hilton, Dallas, Texas.

Feb. 9-10. 4th Annual Dixie Regional Educational Meeting, Dinkler-Plaza Hotel, Atlanta, Ga.

Feb. 17. Annual Technical Session and Banquet, New York Branch, A.E.S., Hotel Statler-Hilton, New York, New York.

Mar. 2-3. Annual Educational Session and Banquet, Philadelphia Branch, A.E.S., Benjamin Franklin Hotel, Philadelphia.

Mar. 3. Eighth Annual Tri-State Regional Educational Session and Banquet, A.E.S., Biltmore Hotel, Dayton, Ohio.

1961 ARTICLE INDEX

Articles published in PRODUCTS FINISHING during 1961, classified by subject . . .

ALLOY PLATING
Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42

ALUMINUM
How Boeing Finishes the B-52—H. O. Meserve, Jr. . . . . Jan., p. 30
An Efficient Batch-Type Anodizing System—Gilbert Tramer, Jack Lashkow . Jan., p. 42
Plating Aluminum for Exterior Service . . . . . Apr., p. 34
Prepainted Aluminum: The New Lines at Kaiser—R. L. Smith . . . . . May, p. 38
Chromate Coatings: Aircraft and Missiles . . . . . July, p. 40
Recent Reports on Plating and Anodizing Aluminum and Magnesium—
Gerard H. Poll, Jr. . . . . Aug., p. 64
How About Aluminum Auto Bumpers? . . . . . Oct., p. 60
Finishing Process Helps Computer "Remember" . . . . . Nov., p. 59

ALUMINUM PLATING
High-Temperature Nickel-Aluminum Coatings . . . . . May, p. 82

ANODIZING
How Boeing Finishes the B-52—H. O. Meserve, Jr. . . . . Jan., p. 30
An Efficient Batch-Type Anodizing System—Gilbert Tramer, Jack Lashkow . Jan., p. 42
Multiple-Purpose Liner for Anodizing Tanks—Jack W. Petersen . . . . . Mar., p. 52
Plating Aluminum for Exterior Service . . . . . Apr., p. 34
Recent Reports on Plating and Anodizing Aluminum and Magnesium—
Gerard H. Poll, Jr. . . . . Aug., p. 64
How About Aluminum Auto Bumpers? . . . . . Oct., p. 60

BAKING
How Boeing Finishes the B-52—H. O. Meserve, Jr. . . . . Jan., p. 30
Roller Coat Painting Aluminum and Steel on Same Line . . . . . Jan., p. 78
An Efficient Painting System in 6000 Square Feet . . . . . Feb., p. 72
Refrigerated Dip Tank Solves Finishing Problem—Gilbert C. Close . . . . . Mar., p. 49
Automated Finishing of Hotstream Heaters—G. H. Hepplewhite . . . . . Mar., p. 58
Conveyorized Spraying and Drying System Lacquers Pencil Ferrules . . . . Mar., p. 82
Vending-Machine Maker Installs New Compact Painting System—
Thomas Spellisy . . . . . Apr., p. 38
Electrostatic Spray Cuts Costs for Furniture Manufacturer—
Sam D. Lockshin . . . . . Apr., p. 64
Lightweight Ovens Hang from Conveyor Rail . . . . . Apr., p. 78
Faster Finishing of Metal Caskets . . . . . Apr., p. 90
Prepainted Aluminum: The New Lines at Kaiser—R. L. Smith . . . . . May, p. 38
Four Conveyors Speed Painting of Die Castings—Ezra A. Blount, Editor . . June, p. 36
Hot Spray Speeds Production, Improves Quality . . . . . July, p. 54
Painting and Plating Steel Furniture—Ezra A. Blount, Editor . . . . . Aug., p. 50
"Moving Bells" Electrostatically Paint Intermixed Sizes . . . . . Aug., p. 60
HTHW: A Different Way To Heat A Paint-Baking Oven . . . . . Aug., p. 82
Vinyl-Metal Laminates: Strength, Texture, Warmth, Formability—
Gerard H. Poll, Jr., Associate Editor . . . . . Sept., p. 40
New Finishing Equipment Triples Production for Lawn Tool Manufacturer . Sept., p. 78

Arvin's Captive Job-Painting Line—Gerard H. Poll, Jr., Associate Editor . . . Oct., p. 50
Automatically Painting Big Structural Sheets—Gilbert C. Close . . . . . Oct., p. 72
Mobile Spindle Unit Aids Job Painter . . . . . Oct. p. 94
Hinac Coatings: Improved Corrosion Resistance for Zinc—P. G. Rech . . . Oct., p. 104
Faster Finish for Transformer Cases . . . . . Nov., p. 80
Prepaint Process Removes Light Corrosion—Ezra A. Blount, Editor . . . . . Dec., p. 36

BARREL FINISHING
Finishing by Multidirectional Motion . . . . . Oct., p. 100
Tumbling Barrels Cut Costs at Parker Pen . . . . . Nov., p. 83

BLAST CLEANING
Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42
Wet Blasting Aids in Printed-Circuit Manufacture . . . . . Mar., p. 62
Wet Blasting Cuts Rejects for Nozzle Manufacturer . . . . . Oct., p. 115
Wet Blasting Improves Cleaning at McGraw-Edison . . . . . Nov., p. 83

BUFFING
Precision Buffing of Weights for Analytical Balances . . . . . Apr., p. 82
Special Machines Buff Interior Door Handles for Automobiles . . . . . May, p. 68

CADMIUM PLATING
Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42
Jelled Plating Solutions for Barrel Plating Precision Parts—
Harry J. West and Richard F. Gieselman . . . . . Mar., p. 44

CHEMICAL MILLING
How Boeing Finishes the B-52—H. O. Meserve, Jr. . . . . Jan., p. 30
(continued)

ELECTRO-POLISHING

Fast, low cost finish for aluminum, copper and alloys, steel and stainless steel. Ideal for decorative finishes, burr removal, electroplate adhesion and size control. Standard and custom concentrates nationally available in any quantity.

for Beauty, Economy, Speed

Let us convince you—send samples for processing.

Write for full data

ELECTRO-GLO COMPANY

625 S. Kolmar Ave., Chicago 24, Ill.

For more data circle 425 on Postpaid Card

1961 Article Index . .

CHROMIUM PLATING

Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42
Two Million Pounds of Nickel Anodes Annually . . . . . Feb., p. 58
New Plating Facilities for Western Electric—Louis Gustad, Jr. . . . . Apr., p. 42
Painting and Plating Steel Furniture—Ezra A. Blount, Editor . . . . . Aug., p. 50

CLEANING

An Efficient Batch-Type Anodizing System—
Gilbert Tramer and Jack Lashkow . . . . . Jan., p. 42
Electrocleaning: A Report on Current Practice—
Louis McDonald, Robert J. Racine, Charles N. Chalfant . . . . . Jan., p. 50
Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42
Two Million Pounds of Nickel Anodes Annually . . . . . Feb., p. 58
Timken's Process for Phosphatizing Bearings . . . . . Mar., p. 64
Vending-Machine Maker Installs New Compact Painting System—
Thomas Spellisy . . . . . Apr., p. 38
New Plating Facilities for Western Electric—Louis Gustad, Jr. . . . . Apr., p. 42
Prepainted Aluminum: The New Lines at Kaiser—R. L. Smith . . . . . May, p. 38
Ultrasonic Cleaning Fundamentals—Gilbert Tint . . . . . June, p. 50
Looking Ahead in Ultrasonics—Albert Valente . . . . . June, p. 58
Chromate Coatings: Aircraft and Missiles . . . . . July, p. 40
Hot Spray Speeds Production, Improves Quality . . . . . July, p. 54
Painting and Plating Steel Furniture—Ezra A. Blount, Editor . . . . . Aug., p. 50
Vinyl-Metal Laminates: Strength, Texture, Warmth, Formability—
Gerard H. Poll, Jr., Associate Editor . . . . . Sept., p. 40
EM + IT = 3F/ALC . . . . . Oct., p. 82
How Shawyder Brothers Finishes Magnesium Extrusions—
James H. Jenkins . . . . . Nov., p. 52
Nylon-Clad Baskets Cut Fixture Costs, Reduce Damage
During Ultrasonic Cleaning . . . . . Nov., p. 85
Prepaint Process Removes Light Corrosion—Ezra A. Blount, Editor . . . . . Dec., p. 36
Ultrasonic Cleaning: Theory and Application—Richard W. Thomas . . . . . Dec., p. 44

CONTROL

Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42

CONVENTIONS, EXPOSITIONS, TECHNICAL SOCIETY MEETINGS

Painters' Problems: II . . . . . Jan., p. 62
A. E. S. Boston Convention . . . . . May, p. 78
Program for 48th Annual Convention, American Electroplaters' Society . . . June, p. 70
Metal Finishing Suppliers' Association Program . . . . . June, p. 92
National Association of Metal Finishers Convention Program . . . . . June, p. 94
Photos from Boston A. E. S. Convention—Gerard H. Poll, Jr. . . . . July, p. 72
Recent Reports on Plating and Anodizing Aluminum and Magnesium—
Gerard H. Poll, Jr. . . . . Aug., p. 64
Platers' Pickling Problems—Gerard H. Poll, Jr., Associate Editor . . . . . Dec., p. 66
Barrel Plating Problems—Gerard H. Poll, Jr., Associate Editor . . . . . Dec., p. 82

CONVEYORS

An Efficient Painting System in 6000 Square Feet . . . . . Feb., p. 72
Timken's Process for Phosphatizing Bearings . . . . . Mar., p. 64
New Plating Facilities for Western Electric—Louis Gustad, Jr. . . . . Apr., p. 42
Electrostatic Spray Cuts Costs for Furniture Manufacturer—
Sam D. Lockshin . . . . . Apr., p. 64
Four Conveyors Speed Painting of Die Castings—Ezra A. Blount, Editor . . June, p. 36
The Difference Between Profit and Loss:
At Crown City Plating Company It's a Conveyor . . . . . June, p. 66
Hot Spray Speeds Production, Improves Quality . . . . . July, p. 54

Painting and Plating Steel Furniture—Ezra A. Blount ..... Aug., p. 50
Arvin's Captive Job-Painting Line—Gerard H. Poll, Jr., Associate Editor ... Oct., p. 50
Automatically Painting Big Structural Sheets—Gilbert C. Close ..... Oct., p. 72
Prepaint Process Removes Light Corrosion—Ezra A. Blount, Editor ..... Dec., p. 36
Painting 10,000 Small Gasoline Engines Daily ..... Dec., p. 74

COPPER PLATING
Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42
Jelled Plating Solutions for Barrel Plating Precision Parts—
Harry J. West and Richard F. Gieselman ..... Mar., p. 44

CORROSION
Corrosion, Corrodkote, Kesternich, Chromium, Copper and Nickel ..... Sept., p. 60
Plastics Show Sharp Variation in Resisting Corrosives ..... Oct., p. 110
Why Ford Chose Galvanized Steel To Improve Corrosion Resistance—
John C. Widman ..... Nov., p. 64

DEGREASING
How Boeing Finishes the B-52—H. O. Meserve, Jr. ..... Jan., p. 30
Timken's Process for Phosphatizing Bearings ..... Mar., p. 64
Ultrasonic Cleaning Fundamentals—Gilbert Tint ..... June, p. 50
Vapor Degreasing: A Study of "Tri" and "Per"—R. C. Fullerton ..... Nov., p. 44
Ultrasonic Cleaning: Theory and Application—Richard W. Thomas ..... Dec., p. 44

DESCALING
Platers' Pickling Problems—Gerard H. Poll, Jr., Associate Editor ..... Dec., p. 66

DRYING
Painting and Plating Steel Furniture—Ezra A. Blount ..... Aug., p. 50
EM + IT = 3F/ALC ..... Oct., p. 82

ELECTROPOLISHING
New Electrolytic Machining Process Shapes Parts in Minutes ..... July, p. 66

ELECTROSTATIC SPRAYING
An Efficient Painting System in 6000 Square Feet ..... Feb., p. 72
Automated Finishing of Hotstream Heaters—G. H. Hepplewhite ..... Mar., p. 58
Electrostatic Spray Cuts Costs for Furniture Manufacturer—
Sam D. Lockshin ..... Apr., p. 64
Painting and Plating Steel Furniture—Ezra A. Blount ..... Aug., p. 50
"Moving Bells" Electrostatically Paint Intermixed Sizes ..... Aug., p. 60
New Finishing Setup Makes Possible Increased
Production in a Smaller Plant ..... Sept., p. 50
Arvin's Captive Job-Painting Line—Gerard H. Poll, Jr., Associate Editor .. Oct., p. 50
EM + IT = 3F/ALC ..... Oct., p. 82

ENAMEL AND LACQUER APPLICATION
How Boeing Finishes the B-52—H. O. Meserve, Jr. ..... Jan., p. 30
Painters' Problems: II ..... Jan., p. 62
Roller Coat Painting Aluminum and Steel on Same Line ..... Jan., p. 78
An Efficient Painting System in 6000 Square Feet ..... Feb., p. 72
Refrigerated Dip Tank Solves Finishing Problem—Gilbert C. Close ..... Mar., p. 49
Automated Finishing of Hotstream Heaters—G. H. Hepplewhite ..... Mar., p. 58
Conveyorized Spraying and Drying System Lacquers Pencil Ferrules .... Mar., p. 82
Vending-Machine Maker Installs New Compact Painting System—
Thomas Spellisy ..... Apr., p. 38
Electrostatic Spray Cuts Costs for Furniture Manufacturer—
Sam D. Lockshin ..... Apr., p. 64
Lightweight Ovens Hang from Conveyor Rail ..... Apr., p. 78
Faster Finishing of Metal Caskets ..... Apr., p. 90
Prepainted Aluminum: The New Lines at Kaiser—R. L. Smith ..... May, p. 38
Hot Airless Spray Improves Berry Door's Finishing System ..... May, p. 74
(continued)

1961 Article Index . .

Four Conveyors Speed Painting of Die Castings—Ezra A. Blount ..... June, p. 36
The Difference Between Profit and Loss:
At Crown City Plating Company It's a Conveyor ..... June, p. 66
Testing Paint Films: Automatic Sprayer Produces Uniformly
Painted Panels—Eric H. Cocks ..... July, p. 50
Hot Spray Speeds Production, Improves Quality ..... July, p. 54
New Finishing Setup Makes Possible Increased
Production in a Smaller Plant ..... Sept. p. 50
Paint Heater Speeds Tractor Production—Everett Gillard ..... Sept., p. 52
Arvin's Captive Job-Painting Line—Gerard H. Poll, Jr., Associate Editor .. Oct., p. 50
Automatically Painting Big Structural Sheets—Gilbert C. Close ..... Oct., p. 72
EM + IT = 3F/ALC ..... Oct., p. 82
Mobile Spindle Unit Aids Job Painter ..... Oct., p. 94
Coating for Incinerators Withstands Heat ..... Nov., p. 87
Prepaint Process Removes Light Corrosion—Ezra A. Blount, Editor ..... Dec., p. 36
Painting 10,000 Small Gasoline Engines Daily ..... Dec., p. 74

EXHAUST SYSTEMS

Fume Scrubber Handles Corrosive Vapors from Bright Dip Tank ..... Apr., p. 86
Air-Flow System and Reinforced Plastic Hood Tame
Corrosive Fumes Above Wire-Pickling Bath ..... Nov., p. 90

FINISHING SYSTEMS

How Boeing Finishes the B-52—H. O. Meserve, Jr. ..... Jan., p. 30
Roller Coat Painting Aluminum and Steel on Same Line ..... Jan., p. 78
Refrigerated Dip Tank Solves Finishing Problem—Gilbert C. Close ..... Mar., p. 49
Lightweight Ovens Hang from Conveyor Rail ..... Apr., p. 78
Prepainted Aluminum: The New Lines at Kaiser—R. L. Smith ..... May, p. 38
Four Conveyors Speed Painting of Die Castings—Ezra A. Blount ..... June, p. 36
The Difference Between Profit and Loss:
At Crown City Plating Company It's a Conveyor ..... June, p. 66
Painting and Plating Steel Furniture—Ezra A. Blount ..... Aug., p. 50
HTHW: A Different Way To Heat A Paint-Baking Oven ..... Aug., p. 82
Vinyl-Metal Laminates: Strength, Texture, Warmth, Formability—
Gerard H. Poll, Jr., Associate Editor ..... Sept., p. 40
Arvin's Captive Job-Painting Line—Gerard H. Poll, Jr., Associate Editor ... Oct., p. 50
Automatically Painting Big Structural Sheets—Gilbert C. Close ..... Oct., p. 72
EM + IT = 3F/ALC ..... Oct., p. 82
Prepaint Process Removes Light Corrosion—Ezra A. Blount, Editor ..... Dec., p. 36

GALVANIZING

Why Ford Chose Galvanized Steel To Improve Corrosion Resistance—
John C. Widman ..... Nov., p. 64

HOT SPRAY

Hot Airless Spray Improves Berry Door's Finishing System ..... May, p. 74
Hot Spray Speeds Production, Improves Quality ..... July, p. 54
Paint Heater Speeds Tractor Production—Everett Gillard ..... Sept., p. 52
Painting 10,000 Small Gasoline Engines Daily ..... Dec., p. 74

INDUSTRIAL RESEARCH

Looking Ahead in Ultrasonics—Albert Valente ..... June, p. 58
New Electrolytic Machining Process Shapes Parts in Minutes ..... July, p. 66
Effect of Organic Compounds on Metal Fatigue ..... July, p. 78
Improved Method for Measuring Abrasion Resistance of Coatings ..... Sept., p. 82
Plastics Show Sharp Variation in Resisting Corrosives ..... Oct., p. 110
Growth Rate of Oxide Films on Copper ..... Nov., p. 98

MAGNESIUM
How Boeing Finishes the B-52—H. O. Meserve, Jr. ..... Jan., p. 30
Recent Reports on Plating and Anodizing Aluminum and Magnesium—
Gerard H. Poll, Jr. ..... Aug., p. 64
How Shwayder Brothers Finishes Magnesium Extrusions—
James H. Jenkins ..... Nov., p. 52

MASKING MATERIALS AND METHODS
Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42

METALLIC COATINGS
High-Temperature Nickel-Aluminum Coatings ..... May, p. 82
Gold Coating Fights Heat in Scout Research Rocket ..... July, p. 58

NICKEL PLATING
Nickel Plate Cuts Buffing Costs ..... Jan., p. 76
Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42
Two Million Pounds of Nickel Anodes Annually ..... Feb., p. 58
Jelled Plating Solutions for Barrel Plating Precision Parts—
Harry J. West and Richard F. Gieselman ..... Mar., p. 44
New Plating Facilities for Western Electric—Louis Gustad, Jr. ..... Apr., p. 42
Painting and Plating Steel Furniture—Ezra A. Blount ..... Aug., p. 50
Recent Reports on Plating and Anodizing Aluminum and Magnesium—
Gerard H. Poll, Jr. ..... Aug., p. 64

PAINT REMOVAL
Hot Chromic Strip Bath for Epoxy-Type Paints—Gilbert Close ..... June, p. 62

PHOSPHATIZING
Painters' Problems: II ..... Jan., p. 62
Roller Coat Painting Aluminum and Steel on Same Line ..... Jan., p. 78
An Efficient Painting System in 6000 Square Feet ..... Feb., p. 72
Improve Your Phosphate Coatings—Dr. David L. Cramer, Hal Frost,
George Pimbley, Archie K. Beard, Robert Jackson ..... Feb., p. 78
Automated Finishing of Hotstream Heaters—G. H. Hepplewhite ..... Mar., p. 58
Timken's Process for Phosphatizing Bearings ..... Mar., p. 64
Vending-Machine Maker Installs New Compact Painting System—
Thomas Spellisy ..... Apr., p. 38
Electrostatic Spray Cuts Costs for Furniture Manufacturer—
Sam D. Lockshin ..... Apr., p. 64
Lightweight Ovens Hang from Conveyor Rail ..... Apr., p. 78
Hot Spray Speeds Production, Improves Quality ..... July, p. 54
Painting and Plating Steel Furniture—Ezra A. Blount ..... Aug., p. 50
"Moving Bells" Electrostatically Paint Intermixed Sizes ..... Aug., p. 60
Vinyl-Metal Laminates: Strength, Texture, Warmth, Formability—
Gerard H. Poll, Jr., Associate Editor ..... Sept., p. 40
Germans Report Alkali Phosphate Lubricants
Effective for Hot Metal Forming ..... Sept., p. 87
Arvin's Captive Job-Painting Line—Gerard H. Poll, Jr., Associate Editor . Oct., p. 50
Automatically Painting Big Structural Sheets—Gilbert C. Close ..... Oct., p. 72
EM + IT = 3F/ALC ..... Oct., p. 82
Prepaint Process Removes Light Corrosion—Ezra A. Blount, Editor ..... Dec., p. 36

PICKLING
How Boeing Finishes the B-52—H. O. Meserve, Jr. ..... Jan., p. 30
Neutralizer Cuts Costs, Makes Pickling Safer ..... May, p. 62
How Shwayder Brothers Finishes Magnesium Extrusions—
James H. Jenkins ..... Nov., p. 52
Platers' Pickling Problems—Gerard H. Poll, Jr., Associate Editor ..... Dec., p. 66
(continued)

1961 Article Index . . .

PLASTIC COATINGS
Method Developed for Vinyl-Lining Steel Pipe ..... July, p. 64
Vinyl-Metal Laminates: Strength, Texture, Warmth, Formability—
Gerard H. Poll, Jr., Associate Editor ..... Sept., p. 40

PLATING
Nickel Plate Cuts Buffing Costs ..... Jan., p. 76
Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42
Jelled Plating Solutions for Barrel Plating Precision Parts—
Harry J. West and Richard F. Gieselman ..... Mar., p. 44
Plating Aluminum for Exterior Service ..... Apr., p. 34
Plating in India: A Letter from Rajkot ..... May, p. 88
Looking Ahead in Ultrasonics—Albert Valente ..... June, p. 58
Tin Plate Replaces Solder Coat on Transistor Shells—Walter P. Alina .... July, p. 36
EM + IT = 3F/ALC ..... Oct., p. 82
Finishing Process Helps Computer "Remember" ..... Nov., p. 59
Barrel Plating Problems—Gerard H. Poll, Jr., Associate Editor ..... Dec., p. 82

PLATING EQUIPMENT AND FACILITIES
What To Look for When Considering A Steam Source—Walter F. Malsbary . Feb., p. 62
Multiple-Purpose Liner for Anodizing Tanks—Jack W. Petersen ..... Mar., p. 52
New Plating Facilities for Western Electric—Louis Gustad, Jr. ..... Apr., p. 42
Improved Nickel Plating with Ball Anodes—Charles T. Walker ..... July, p. 70
Panel-Coil Heating and Cooling of Process Solutions ..... Nov., p. 91
Barrel Plating Problems—Gerard H. Poll, Jr., Associate Editor ..... Dec., p. 82

PLATING RESEARCH
Why Barrel Zinc Plating of Carbonitrided Steel Is Difficult—
Dr. Nelson F. Murphy ..... Jan., p. 84
Jelled Plating Solutions for Barrel Plating Precision Parts—
Harry J. West and Richard F. Gieselman ..... Mar., p. 44
An Electrochemical Index for Porosity—Dr. Nelson F. Murphy ..... Mar., p. 74
High-Temperature Nickel-Aluminum Coatings ..... May, p. 82
Effect of Organic Compounds on Metal Fatigue ..... July, p. 78
Corrosion, Corrodkote, Kesternich, Chromium, Copper and Nickel ..... Sept., p. 60

PLATING SOLUTION MAINTENANCE
An Improved Method for Removing Carbonates from
Cyanide Plating Solutions—Carl R. Reinheimer, Jr. ..... May, p. 50

POLISHING
Techniques for Setting Up Felt Polishing Wheels—C. Edmund Snook ..... June, p. 42
Nylon Abrasive Wheel Creates Unusual Finish ..... Sept., p. 79
Many Applications for Nylon Abrasive Fabric ..... Nov., p. 78

RUST REMOVAL
Prepaint Process Removes Light Corrosion—Ezra A. Blount, Editor ..... Dec., p. 36
Platers' Pickling Problems—Gerard H. Poll, Jr., Associate Editor ..... Dec., p. 66

SILVER PLATING
Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42
Jelled Plating Solutions for Barrel Plating Precision Parts—
Harry J. West and Richard F. Gieselman ..... Mar., p. 44

SPRAYING
How Boeing Finishes the B-52—H. O. Meserve, Jr. ..... Jan., p. 30
Four Conveyors Speed Painting of Die Castings—Ezra A. Blount, Editor .. June, p. 36
Automatically Painting Big Structural Sheets—Gilbert C. Close ..... Oct., p. 72
Mobile Spindle Unit Aids Job Painter ..... Oct., p. 94

STEAM HEATING EQUIPMENT
What To Look for When Considering a Steam Source—Walter F. Malsbary . Feb., p. 62

STRIPPING PLATED DEPOSITS
Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42

SURFACE CONVERSION COATINGS
How Boeing Finishes the B-52—H. O. Meserve, Jr. . . . . Jan., p. 30
Prepainted Aluminum: The New Lines at Kaiser—R. L. Smith . . . . . May, p. 38
Chromate Coatings: Aircraft and Missiles . . . . . July, p. 40
Germans Report Alkali Phosphate Lubricants
Effective for Hot Metal Forming . . . . . Sept., p. 87
Automatically Painting Big Structural Sheets—Gilbert C. Close . . . . . Oct., p. 72
Hinac Coatings: Improved Corrosion Resistance for Zinc—P. G. Rech . . . . Oct., p. 104
Conversion Coating Improves Aluminum Fencing . . . . . Nov., p. 62

TESTING
Plating Aluminum for Exterior Service . . . . . Apr., p. 34
Significant Improvement in Corrosion Testing—C. H. Neffinger . . . . . Apr., p. 70
Outdoor Exposure Confirms Laboratory Tests on Thicker Chromium Plate . May, p. 72
Testing Paint Films: Automatic Sprayer Produces
Uniformly Painted Panels—Eric H. Cocks . . . . . July, p. 50
Corrosion, Corrodkote, Kesternich, Chromium, Copper and Nickel . . . . . Sept., p. 60
Improved Method for Measuring Abrasion Resistance of Coatings . . . . . Sept., p. 82

TIN PLATING
Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42
Jelled Plating Solutions for Barrel Plating Precision Parts—
Harry J. West and Richard F. Gieselman . . . . . Mar., p. 44
Tin Plate Replaces Solder Coat on Transistor Shells—Walter P. Alina . . . . July, p. 36

TRAINING COURSES
Training Courses in Finishing . . . . . Sept., p. 56

ULTRASONIC CLEANING
Ultrasonics Speeds Cleaning for Thiokol Laboratories . . . . . Oct., p. 114
Ultrasonic Cleaning: Theory and Application—Richard W. Thomas . . . . . Dec., p. 44

VACUUM METALLIZING
Metallized Plastic Bonded to Aluminum Results in Flashy Products . . . . . Nov., p. 82

VINYL LAMINATES
Vinyl-Metal Laminates: Strength, Texture, Warmth, Formability—
Gerard H. Poll, Jr., Associate Editor . . . . . Sept., p. 40

WASTE DISPOSAL
Plating—A Vital Part of Aircraft Engine Overhaul—Ezra A. Blount, Editor . Feb., p. 42
Industrial Wastes Committee Reports on Research Developments . . . . . July, p. 63
Waste Incinerator: Safe Cyanide Disposal . . . . . Nov., p. 87

WATER TREATMENT
New Plating Facilities for Western Electric—Louis Gustad, Jr. . . . . Apr., p. 42

WEATHER TESTING
Plating Aluminum for Exterior Service . . . . . Apr., p. 34
Urethane Paints Weather Tested by Allied Chemical Plants . . . . . Apr., p. 87
Outdoor Exposure Confirms Laboratory Tests on Thicker Chromium Plate . May, p. 72
Why Ford Chose Galvanized Steel To Improve Corrosion Resistance—
John C. Widman . . . . . Nov., p. 64

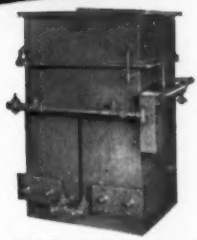
ZINC PLATING
Why Barrel Zinc Plating of Carbonitrided Steel Is Difficult—
Dr. Nelson F. Murphy . . . . . Jan., p. 84
Jelled Plating Solutions for Barrel Plating Precision Parts—
Harry J. West and Richard F. Gieselman . . . . . Mar., p. 44
New Plating Facilities for Western Electric—Louis Gustad, Jr. . . . . Apr., p. 42
EM + IT = 3F/ALC . . . . . Oct., p. 82
Barrel Plating Problems—Gerard H. Poll, Jr., Associate Editor . . . . . Dec., p. 82

The Finishing Touch

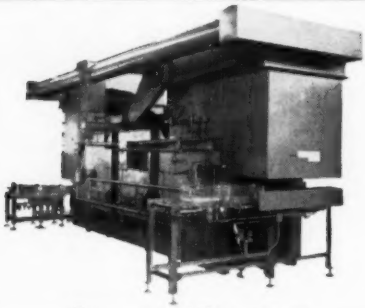
"I have the only accident-free record, and I aim to keep it that way."

Whatever your parts cleaning problem... BLAKESLEE equipment does it better... for less!

Blakeslee builds all sizes and types of metal parts washers, solvent vapor degreasers and solvent recovery stills. There's bound to be a Blakeslee machine that can solve your cleaning problems and save you money. For more information . . . and a free cost analysis of your cleaning operation . . . write today!

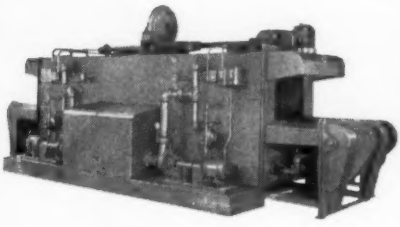


Dip Tank Degreasers

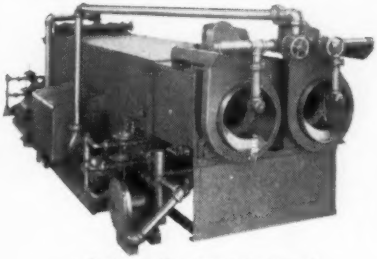


Conveyorized Degreasers

Ultrasonic Equipped Degreasers



Conveyorized Belt Type Parts Washers



Automatic, Conveyorized, Spiral Tumbling Parts Washers

G. S. BLAKESLEE & CO. Dept. 104-M
1844 So. Laramie Ave., Chicago 50, Ill.
New York • Los Angeles • Toronto

NOW! Degrease and paint in one machine, one continuous operation with Blakeslee dip or spray equipment for hot painting with non-flammable, trichlorethylene thinned paints.

For more data circle 426 on Postpaid Card

DECEMBER ADVERTISERS' INDEX

Acme Mfg. Co. 112, 113
Agate Lacquer Mfg. Co., Inc. 165
Allied Chemical Corp., Solvay Process Div. 22
Allied Finishing Specialties Co. 104
Allied Research Products, Inc. 132, 133
Almco, Queen Products Div., King-Seeley Thermos Co. 125
Amchem Products, Inc. 144, 145
Ametek, Inc. DeBothezat Fans Div. 33
Anaconda American Brass Co. 9
Apco Oil Corp. 27

Baker Co., M. E. 163
Baron Industries 100
Barrett Co., Leon J. 129
Behr-Manning Co. 31
Belke Mfg. Co. 30
Better Finishes & Coatings, Inc. 79
Binks Mfg. Co. 10, 11
Blakeslee & Co., G. S. 175
Bond Chemical Products Co. 155
Branson Instruments, Inc. 23
Bruce Products Co. 158
Bush Mfg. Co. 136
By-Buk Co. 138

Carbic-Hoechst Corp. 25
Chemical Corp. 127
Churchill Co., Inc., Geo. R. 72
Cincinnati Cleaning & Finishing Machinery Co. ..... Second Cover
Continental Rack Co., Inc. 108
Corning Glass Works 97
Cosden Paint Co. 137
Cowles Chemical Co. 34

DeBothezat Fans, A Div. of Ametek, Inc. 33
Delavan Mfg. Co. 130
DeVilbiss Co. 16, 17
Dow Chemical Co. 64-B,-C
DuBois Chemicals, Inc. 29
Du Pont de Nemours & Co., Inc., E. I. 20, 21
Durand & Huegenin 25

Electro-Glo Co. 167
Engelhard Industries, Inc. 15
Enjay Chemical Co. 109
Enthone, Inc. 95

Factory Installations Corp. 146
Federated Metals Div., American Smelting & Refining Co. 57
Fortune Industries, Inc. 153

Granco, Inc. 101

Hammond Machinery Builders, Inc. 7
Hanson-Van Winkle-Munning Co. 4, 43, 80, 81
Harper Buffing Machine Co. 147
Harshaw Chemical Co. 105
Heatbath Corp. 58
Hooker Chemical Corp. 111
Hull & Co., Inc., R. O. 3

Ideal Chemical Co. 156
Illinois Water Treatment Co. 24
International Rustproof Co. 71

Jelco Finishing Equipment Corp. 102

Kirk & Blum Mfg. Co. 28
Koch Sons, Inc., Geo. 64-A
Kushner Electroplating School 160

Lanly Co. 65

MacDermid, Inc. ..... Third Cover
Magnus Chemical Co., Inc. 143
Mahon Co., R. C. 48, 49
Microbeads, Inc. 141
Midland Industrial Finishes Co. 161
Minnesota Mining & Mfg. Co. 99
Mitchell-Bate Co. 156
Morse Mfg. Co., Inc. 152
Murray-Way Corp. 64

National-Detroit, Inc. 157
Nikolas & Co., Inc., G. J. 103
Nordson Corp. 52, 53
Northwest Chemical Co. 19
Norton Co. 2
Nu-Lite Plating Equipment Co., Inc. 154

Oakite Products, Inc. 1

Parker Rust Proof Co. 107
Pennsalt Chemicals Corp. 13

Radcor, Inc. 106
Rampe Mfg. Co. 14
Ransburg Electro-Coating Corp. 131
Rapid Electric Co. 64-D
Red Devil Tools 26
Research Products Corp. 78, 124
Ross Engineering, J. O., Div. of Midland-Ross Corp. 91
Roto-Finish/Ransohoff 55

SAMES 115
Sarco Co., Inc. 77
Sellers Engineering Co. 8
Sel-Rex Corp. 63
Sethco Mfg. Corp. 116, 117
Solvay Process Div., Allied Chemical Corp. 22
Solventol Chemical Products, Inc. 128
Southwestern Engineering Co. 119
Spra-Con Co. 151
Spraying Systems Co. 96
Stevens, Inc., Frederic B. 121
Stutz Co. 6
Sulphur Products Co., Inc. 148
Sundstrand Corp. 69
Syntron Co. 12

Tenax Finishing Products Co. 158
Ti-Co Industries, Inc. 154, 160
Titanium Products Corp. 114
True Brite Chemical Products Co. 122
Turco Products, Inc. ..... Fourth Cover

Udylite Corp. 32-A,-B,-C,-D
Unit Process Assemblies, Inc. 140
U. S. Paint Co. 118
U. S. Stoneware Co. 135
Universal Vibrating Screen Co. 159
Univertical Corp. 139

Vanton Pump & Equipment Corp. 98, 120
Varnish Products Co. 126
Vic Mfg. Co. 123

Westinghouse Electric Corp. 18
Wilder Mfg. Co., Inc. 142
Wyandotte Chemicals Corp. 73

Young Bros. Co. 110

NEW FROM MACDERMID

A safe, fast gold stripper that lets you salvage gold-plated rejects and reclaim your gold to use again. **METEX AUROSTRIP*** *needs no additional chemicals, no current. Strips gold from silver, brass, copper, nickel, steel, stainless steel, magnesium and aluminum by immersion only. A safe, fast, easy-to-handle dry powder that dissolves in water.*

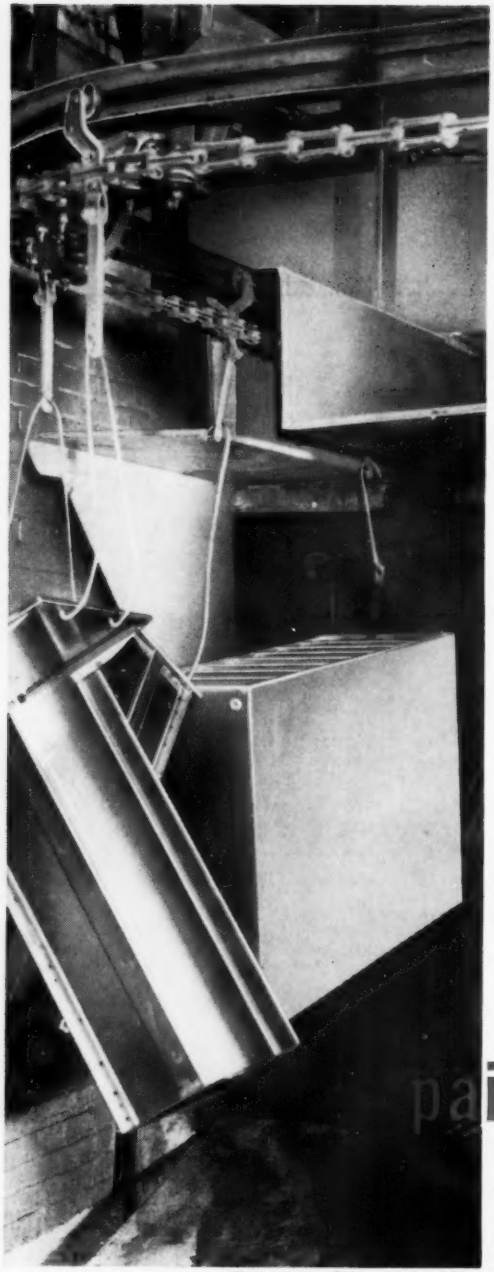
* *Patent Pending*

MacDermid
INCORPORATED
...right to the Finish! ®
WATERBURY, CONNECTICUT
Ferndale, Mich. • Torrance, Calif.

Write for complete technical data . . . or ask your MacDermid Representative for details on this new, economical method of reclaiming gold from the spent solution.

METAL CLEANERS • COPPER PLATING PROCESSES • DRY ACID REPLACEMENT SALTS • MACROMATE CONVERSION COATINGS • ELECTRO AND CHEMICAL POLISHES • BURNISHING AND OTHER METAL FINISHING COMPOUNDS

For more data circle 302 on Postpaid Card



better paint adhesion

***PAINTITE** cleans & phosphates . . . simultaneously*

- *Superior cleaning*
- *Used at 140°-180° F.*
- *Low foaming*
- *Less post rust*
- *No white streaking*
- *Economical and long lived*
- *Uniform coating*
- *Use by immersion or spray washer*
- *Minimizes clean-up problems*
- *Combats alkaline water conditions*
- *Requires only 3 stages*

Write for free illustrated folder describing Paintite and the ten other Turcoat phosphate and conversion coating processes.

paintite

TURCO

TURCO PRODUCTS, INC.
Chemical Processing Compounds
24600 South Main Street, Wilmington, Calif.
FACTORIES: Rockdale, Ill., Houston, Wilmington, London, Rotterdam, Sydney, Mexico City, Paris, Hamburg, Montreal, Manila, Naha (Okinawa)
OFFICES IN ALL PRINCIPAL CITIES

For more data circle 303 on Postpaid Card